

American Aviation

NOVEMBER 27,

356

THE AIR
INDUSTRY'S
PIONEER
INDEPENDENT
MAGAZINE

Here to Stay

FEW THINGS in aviation have been so tenuous and insecure as a feeder airline certificate. The basic reason, of course, is because few policies of the CAB have been so incoherent, inconsistent and so susceptible of overnight change, as the CAB's approach to the feeder problem.

To cap the hodge-podge system of route structure developed around the country has been the failure of the aviation industry to develop and build a truly suitable transport airplane for local operations. No manufacturer could risk such a project in a field so insecure and unstable.

But better days are ahead. The new CAB chairman, Del Rentzel, is using his administrative abilities to bring order out of chaos. The shaky feeder airline picture is in a fair way to becoming stabilized.

There was a time not many months ago when it was not even certain that there would be a feeder airline system in the country. Mobilization plans called for suspension of most or all of the feeders. No feeder operator could plan ahead more than a week at a time. He never knew what the next mail would bring from CAB.

It now seems certain that feeder airlines are a permanent part of the air transport network. Not only that but they will be called *local service airlines*, not feeders, in the future, a much more accurate and appropriate terminology. Certificates will be given a longer tenure, sufficiently so as to permit planning and efficiency.

But one of the finest developments in the stabilized local service pattern is the prospect of a transport plane designed especially for local services. The local lines know what they want. The manufacturers have received the specifications. And CAB chairman Rentzel has let it be known that one way or another, the right kind of an airplane will be built. If the manufacturers don't come forth with proposals, Congressional aid will be sought.

There is general agreement—and all local service airlines are included in this concurrence—that the local route structures are far from perfect.

There won't be any easy or quick solution to iterations of route structures, but at least the matter is now under study. Every local service operator would like to take over small stops now being served by varying degrees of profit or loss by trunklines, but

(Turn to Page 8)



New NATA President

John T. Griffin, president of East Coast Aviation Corp., Boston-Bedford Airport, Mass., is the newly elected president of National Aviation Trades Association. Griffin founded his fixed base operation in 1931, in 1940 became chief pilot for Northeast Airlines, and in 1942 helped pioneer year-round trans-Atlantic operations for the Ferrying Command. President of Massachusetts Aviation Trades Association for the past two years, he recently was appointed to NSRB's aviation training committee.

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Proofing Airline Operations 13

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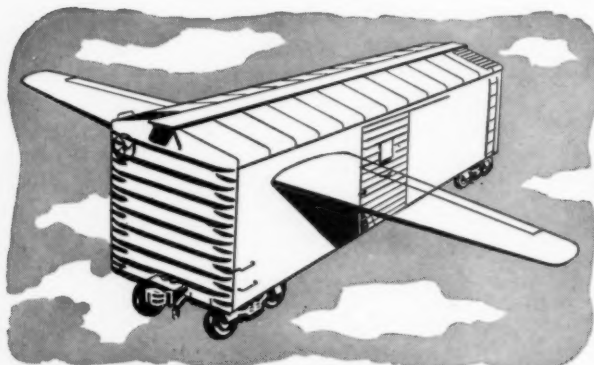
AMERICAN AVIATION DAILY

CENTRAL AVIATION GUIDE

AMERICAN AVIATION DIRECTORY

Engineered TO ORDER!

The Fairchild C-119 twin-engine cargo and troop transport was engineered to fill the order for a plane that can utilize small landing fields, fly long or short distances economically—carry huge loads of men, cargo and equipment under all operating conditions.



THE BOX-CAR PRINCIPLE in which maximum space is utilized was incorporated as the basis of the overall C-119 design. No tapered or circular design to lose valuable extra storage space.



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ENGINE AND AIRPLANE CORPORATION

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American Aviation

THE AIR INDUSTRY'S FIRST NEWS MAGAZINE

NEWS SECTION

Volume 14 Number 19

November 27, 1950

a LOOK at the WEEK

Outlook for priorities for civil planes and parts was very gloomy last week, with both manufacturers and airlines describing situation as critical. National Production Authority had not acted and gave no indication that it would. One thing was certain: unless something is done soon, civil aviation is in for a hard time.

Top-level Washington officials foresee a Controlled Materials Plan, similar to that of World War II, some time next year if defense requirements continue as anticipated.

Tip-off on defense requirements was given last week by NSRB Chairman Stuart Symington, who said revisions are being made as a result of Korea and that there'll be "increases, not decreases."

Plane manufacturers trying to obtain materials without priorities for civil transport production have found that procurement time on almost all items has increased from 60 to 150 days.

Military services, in supplemental appropriation request now in preparation, will probably include requests for funds to cover aircraft cost increases since start of Korean war. Alternative is reducing programmed number of aircraft.

The Jan. 15 deadline set for final report of National Security Resources Board's task groups on civil aviation mobilization plans definitely won't be met. Principal reason is drawn-out procedure involved in getting security clearances for officials serving on various committees.

Earlier shaky position of local service airlines (feeders), especially under mobilization plans, has been reversed. Local lines now seem quite secure on permanent basis, although there may be future changes in route structures. Basically, local lines are now to be solid, permanent part of air transport industry.

Brand-new airport study is being made, this time by local service airlines, to see how many down-town or close-in fields or landing strips can be built in small towns. Project has strong CAB-CAA support on basis that future of local lines is wrapped up in close-in fields easily accessible to patrons.

\$273 Million Transport Backlog

Manufacturers of transport aircraft now have a combined backlog of about \$273,000,000 in two and four-engine transports, including an estimated \$90,000,000 worth of commercial-type planes destined for military service. Three manufacturers are building a total of 260 units, 50 of which are military.

Douglas Aircraft Co. is the leading manufacturer, both from the standpoint of dollar value and units on backlog. It has scheduled construction of 114 DC-6's: 79 commercial, 18 for Air Force, 11 Navy and six unassigned. Douglas' commercial DC-6 backlog, based on an average of \$1,050,000 per plane, is \$82,950,000, not counting value of the six unassigned planes. The military DC-6's add an estimated \$40,000,000 to the backlog. Production schedule runs through September, 1952. Douglas also estimates an annual sales rate of \$8,500,000 in spare parts.

Lockheed Aircraft Corp. has commercial backlog of \$62,230,000, based on average plane price of \$1,270,000, with orders for 49 L-749 and L-1049 Constellations from seven operators. Military orders for 10 Air Force and 11 Navy L-1049's add an estimated \$50,000,000 to the backlog. Schedules run through February, 1953. Lockheed estimates \$7,000,000 worth of spare parts business per year for 1951 and 1952.

The Glenn L. Martin Co. has orders for 76 twin-engine 404 transports from TWA and Eastern Air Lines, a backlog of \$38,000,000, based on \$500,000 average plane price. Deliveries run through March, 1952. Spare parts sales are estimated at \$1,662,500 a year for next two years.

Boeing Airplane Co. and Consolidated Vultee Aircraft Corp., the other two major transport builders, have no transport backlog. Boeing estimates Stratocruiser spare parts sales at \$1,337,500, Convair \$2,000,000 on Convairs.

Hitherto unannounced commercial orders include:

KLM Royal Dutch Airlines: New orders for nine L-1049 Constellations and seven DC-6B's. KLM has announced only five Connies; actual number is nine. Financing details are holding up announcement of other four. Connies will be delivered as follows: two each in October, November, December, 1952; two in January, one in February, 1953. DC-6B delivery schedule is one in January, two in February, one in March, two in April and one in May, 1952.

Arabian Oil Co.: Two DC-6B's, with delivery schedule of one in March and one in July, 1952.

Confidential: An order for one DC-6, for delivery in August, 1951, from an unnamed buyer.

Expansion Loans Established

Procedures for obtaining direct government loans from Reconstruction Finance Corp. for plant expansion, development of technological processes, or production of essential materials were established by National Security Resources Board on Nov. 22.

Following is general information covering such loans:

Use of Funds: Funds must be used for purposes listed above. Funds will be loaned only if it can be shown that their use will speed production and deliveries or services to aid in carrying out government contracts for national defense. Applicant must be able to show that funds for such purposes are not otherwise available on reasonable terms. In other words, loans will be granted only

when applicant is unable to obtain them from private financial sources, with or without government guarantee, or from other public sources on reasonable terms.

Factors Considered: Government will consider following factors: feasibility of project, competence of management, absence of more economical means for obtaining the scarce material or services, availability of necessary factors of production, effect upon small business and competitive enterprise, and need to eliminate bottlenecks in production or distribution of materials or services needed for defense.

Where to File: Applicants may file forms in Washington with Departments of Commerce, Agriculture, and Interior and Defense Transport Administration, which are certifying agencies. Outside Washington, applications will be accepted at field offices of above agencies and transmitted to Washington. In event applicant has negotiations or other business relations with other agencies of government, such as Air Force, he may place his application with the agency with which he is dealing, for transmittal to proper agency in Washington.

Investigation: Certifying agencies will be responsible for thorough investigation of applications. When approved, RFC will act as agent for making the loan.

Where to Obtain Forms: Copies of 12-page application form can be obtained from NSRB Business Expansion Office, 1725 F St., N.W., Washington, and also from certifying agencies in Washington. They will be available shortly at field offices.

13-City Airport Survey

A survey to determine adequacy of U. S. airports in time of emergency will be made at 13 cities by an industry-government task group appointed by CAB Chairman D. W. Rentzel in his capacity as chairman of the air transport mobilization survey of National Security Resources Board.

The group will make recommendations on airport development, maintenance and use agreements in time of emergency or in a "state of readiness." Ways and means of getting maximum use of airports for both civil and military needs will be one of the group's objectives. Consideration will be given to needed emergency airport improvements and their value to the nation as peace-time assets.

Airports to be visited, and dates, are: Minneapolis/St. Paul, Nov. 28; Kansas City, Nov. 29; Denver, Dec. 1; Spokane, Dec. 2; Seattle, Dec. 4; San Francisco/Oakland, Dec. 5-6; Los Angeles, Dec. 7; Long Beach, Dec. 8; Houston, Dec. 11; New Orleans, Dec. 13; Atlanta, Dec. 15.

The group is headed by A. B. Curry, director of Dade County Port Authority, Florida. Other members are Robert Cook, CAA; Paul H. Stafford, CAA; R. L. Froman, CAB; Maj. Paul L. Steinle, Air Force; Comdr. E. J. Lanegan, Navy; Henry Pellegrino, Civilian Components Board; Louis Inwood, director of aviation, Kansas City; W. S. Curry, planning consultant. Assisting will be CAA district airport engineers and regional superintendents of airports in locations involved.



MANUFACTURERS

NPA to Require Reports: National Production Authority will require defense contractors to file quarterly reports on production, critical metals used, employment, payroll, etc. The forms, tentatively designated NPA-R-1, are expected to be ready for distribution in late November or early December, and Jan. 25 will be deadline for reporting final 1950 quarter. Information to be required: (1) physical location of plant on a plant basis; if company has more than one plant, report must be filed for each plant rather than on a company basis; (2) employment and payroll; employment data must be broken down into number of productive workers

and man-hours; (3) products shipped, broken down into rated and unrated orders; number of unfilled rated orders at Dec. 31; estimate of value of orders for second quarter of 1951; (4) inventory of critical materials and amounts used during fourth quarter.

Luscombe Order: Letter of intent from Consolidated Vultee Aircraft Corp.'s Ft. Worth plant has been received by Luscombe Aircraft Corp. for fabrication of undisclosed quantities of elevators and several different types of door assemblies for B-36 bomber. Luscombe will add several hundred employees.

Plans for Columbus: North American Aviation, which took over the former Curtiss-Wright Airplane Division plant at Columbus, O., last Saturday, disclosed that in addition to the same type of work C-W has been doing (chiefly B-29 modification), fabrication of all non-current spares (F-51, F-82 and B-25) is being moved to Columbus. **R. G. Clarke**, who has been general superintendent of NAA's Long Beach plant and during the war filled the same role at Kansas City, has been named factory manager of the plant. **C. J. Gallant**, assistant to the president, is acting as general executive pending appointment of a permanent division manager.

Enters Electronics: Thompson Products Inc. is entering the electronics field, having signed exclusive license agreement with Designers for Industry Inc. under which Thompson takes over development, manufacture, sales and service of a line of coaxial switches.

Goodyear Sub-Contract: Receipt of sub-contract from Piasecki Helicopter Corp. to build complete fuselage shells and landing gear for H-21 Air Force rescue helicopter has been confirmed by Goodyear Aircraft Co. Contract, which runs into 1952, also includes detail design and production engineering.

Expands Test Lab: A \$650,000 expansion program of its Ft. Worth engineering test laboratory has been started by Consolidated Vultee Aircraft Corp. Move into new quarters will increase lab's floor space from 17,000 to 45,000 sq. ft.

Lockheed Negotiates: Lockheed Aircraft Corp. is negotiating with Los Angeles County to lease 240 acres at Palmdale Airport for dual purpose of having a standby field available to handle final deliveries of military jet planes and to prepare for future eventualities.

People: **John Atha**, formerly Curtiss-Wright Airplane Division's Dayton representative, has been named mid-west representative of Ryan Aeronautical Co.'s Metal Products Division, with headquarters at Dayton, O. . . **Frederick B. Babcock** has been appointed assistant sales manager of Purolator Products Inc., in charge of aviation, government and export equipment sales . . .



PLANES & EQUIPMENT

T-34's in Flying Boat: Navy has decided to build one of six Convair R3Y-1 flying boats with Pratt & Whitney T-34 turbo-props instead of Allison T-40's which powered the prototype and which will also power other production models. Also, one model of Douglas A2D attack bomber, a T-40 installation, will have T-34. Navy will evaluate comparative performance.

J-33 Performance: Lockheed F-94's accelerated service test at Muroc, in which three planes were flown continuously by Air Force test pilots in shifts, was completed without change of any one of the afterburner-equipped Allison J-33 engines.

CF-100 at Dayton: The CF-100, Avro Canada's all-weather jet fighter, is at Wright-Patterson AFB, Dayton, O., where Air Materiel Command pilots will test-fly the plane.

(Continued opposite page 54)



The BEECHCRAFT Line Lands on GOODYEAR

Beechcraft votes Goodyear-all the way

Beechcraft BONANZA



FOR tires, tubes, wheels, and brakes, Beech Aircraft standardizes on Goodyear for all its planes. Thus every Beechcraft gains from Goodyear's experience of 40 years in aviation and Goodyear's unmatched engineering resources for developing new equipment to meet new and growing needs.

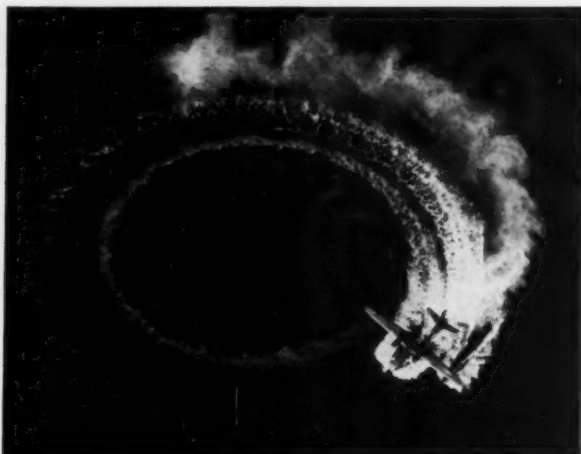
Goodyear's AIRFOAM, which makes possible seating of greater comfort and lower weight, is also installed on some Beechcraft models.

Beech, and all aircraft builders, find

Goodyear aviation engineers always eager to cooperate in designing and producing wheels, brakes, AIRFOAM cushioning and other equipment for new planes and special conditions. That's why more aircraft land on Goodyear tires, tubes, wheels and brakes than on any other kind.

For information on Goodyear aviation products, write—

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Akron 16, Ohio or Los Angeles 54, Calif.



Short Turn—Martin XP5M-1 Marlin flying boat chases its tail. The Navy is testing the Marlin's new underwater rudders and brake.



Scorpions —

New features in the production Northrop F-89 all-weather interceptors are the external balances on the stabilizers, internally sunk antenna, a longer and more shapely nose, and wingtip fuel tanks. With afterburners the F-89 is in the 600-mph class and the maximum weight is about 30,000 lbs.



Pin Ceremony—Charles E. (Chuck) Beard, executive vice president of Braniff Airways, receives his 15-year service pin from President T. E. Braniff in a ceremony at Braniff headquarters in Dallas. Witnessing the pin-pinning are: John B. Walker, vice president—traffic and sales, and Ray C. Shrader, vice president—operations, on the left, and C. G. Adams, secretary-treasurer, on the right. Seventy-six years of Braniff service are represented by the group. On November 6, Braniff received the company's first 20-year pin.

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AMERICAN AVIATION

BOEDY'S ALBUM



W. B. "Bill" Woolsey
American Airlines
at Dallas, Texas
May 5, 1939



W. R. "Sandy" Sanford
American Airlines
at Dallas, Texas
May 5, 1939



I. W. "Ike" Tilson
Bennett Aircraft
Dallas, Texas
May 5, 1939



Fred Ball (QB)
Delta Air Lines
at Dallas, Texas
May 5, 1939



Charles E. Hanst (QB)
Manager, Love Field
Dallas, Texas
May 5, 1939



Myrtle Lee Baker
Braniff Airways
Dallas, Texas
May 6, 1939



Margaret Boyd
Braniff Airways
Dallas, Texas
May 6, 1939



Kathlyn (Mrs. L. H.) Luckey
and "Little Luckey"
Dallas, Texas
May 6, 1939



C. W. "Stormy" Rodreick (QB)
Booth-Henning, Inc.
Dallas, Texas
May 6, 1939



Dorothy Rodreick
(Mrs. C. W.)
Dallas, Texas
May 6, 1939



F. C. "Cliff" Pettitt (QB)
Guiberson Diesel Engine
Dallas, Texas
May 6, 1939



Willie Peck
Braniff Airways
Dallas, Texas
May 6, 1939



Marie "Honey" Darnell
(Mrs. Gordon)
Dallas, Texas
May 6, 1939



W. A. "Steve" Stephens, Jr.
Braniff Airways, Inc.
Dallas—Oklahoma City
May 7, 1939



C. E. "Brad" Bradley
Braniff Airways, Inc.
at Oklahoma City
May 7, 1939



A. K. "Jack" Horner
Braniff Airways, Inc.
Oklahoma City-Wichita
May 8, 1939

BOEDY'S ALBUM



J. P. "Jack" Gaty
Beech Aircraft Co.
Wichita, Kansas
May 9, 1939



Duane L. Wallace
Cessna Aircraft
Wichita, Kansas
May 9, 1939



Dwight S. Wallace
Cessna Aircraft
Wichita, Kansas
May 9, 1939



T. B. "Tom" Salter
Cessna Aircraft
Wichita, Kansas
May 9, 1939



C. E. "Gene" Colwell
Braniff Airways, Inc.
Wichita, Kansas
May 9, 1939



Mary K. Rich
Stearman Aircraft
Wichita, Kansas
May 9, 1939



Lillian (Mrs. W. H.) Whipple
Stearman Aircraft
Wichita, Kansas
May 9, 1939



Lee E. Bishop (QB)
Mid-Continent Airlines
Kansas City, Missouri
May 10, 1939



D. L. "Dave" Behncke (QB)
Air Line Pilots Ass'n
at Kansas City, Mo.
May 10, 1939



Fred R. Balsiger
Bredouw Airmotive
Kansas City, Mo.
May 10, 1939



Marion Melcher
Bredouw Airmotive
Kansas City, Mo.
May 10, 1939



S. A. "Si" Morehouse (QB)
Trans. & Western Air
Kansas City, Missouri
May 10, 1939



E. T. "Ed" Price
Solar Aircraft
at Kansas City
May 10, 1939



S. M. "Toots" Kasper
at QB Meeting
Kansas City, Mo.
May 10, 1939



H. G. "Hal" Hess (QB)
Trans. & Western Air
Kansas City, Mo.
May 10, 1939



D. L. "Doc" Mesker (QB)
Trans. & Western Air
Kansas City, Mo.
May 10, 1939

CHAMPION



Teamwork Gets Results!

THE AVIATION BUSINESS has a way of solving problems common to the industry that's as simple as it is direct—they get together!

Last September some 150 top technicians representing military and civilian air groups from all parts of the world got together for the sixth annual Champion Spark Plug and Ignition Conference.

The ultimate objective of these conferences is, of course, increasing the service life of spark plugs to the point where scheduled removal rates correspond to engine overhaul periods. There is little doubt, according to data presented by various airlines, that this objective is nearer than ever and it was the consensus that the Champion R37S-1 spark plug is a major factor in this improvement!

During the first six months of this year nearly 36 million route miles were flown by U.S. domestic trunk lines and U.S. international lines, and 95.4% of these miles were flown with dependable Champion Spark Plugs proving, once again, that in the air—as in every other engine field—Champion is America's favorite because of its better performance!

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO

More Airlines Fly with CHAMPIONS than Any Other Make!



it isn't easy to work out a formula applicable to the entire country. Some of the secondary trunk carriers are quite heavily dependent upon small stops to bolster their own route structures and they could not be expected to give up such small stops to the newer feeders without an argument.

In addition to this reluctance to give up small stops, many of the trunks want more assurances than have been given in the past that the local lines will not become non-stop competition sometime in the future. But there are numerous instances where both trunks and local lines can benefit by transfers of small stops.

We are also pleased to see progress being made to provide more downtown or close-in airports or landing strips for local lines. The salvation for many local services rests with easily accessible airfields. Short-haul business cannot develop when airports are eight or ten miles from the smaller towns.

As for local service certificates, it is now obvious that the original three-year terms were not adequate to provide security, planning or the development and purchase of equipment. Just what CAB will finally decide is not known at the moment, but it seems certain that certificates will have sufficient life to avoid the short-term limitations of the past.

We are pleased to see, also, a plan to make life easier for the local lines in their relations with CAB. The agency is establishing what amounts to a new public relations officer to assist all carriers and all interested parties in expediting proceedings and cutting red tape. One local line spent \$30,000 in legal fees in Washington last year, much of this being spent in chasing down documents, etc., pertaining to regulatory proceedings, which the CAB could have furnished itself had it been efficiently organized.

All of this is a healthy and constructive approach to the local service field. We hope Mr. Rentzel's common-sense attack on the local service problems turns into a favorable trend.

GE Acts Quickly

WE HAVE been informed that General Electric Company has withdrawn its illustrated lecture and booklet, "Tote That Bale," which we criticized editorially in the November 13 issue. It seems that the higher echelons in GE were unaware of what the locomotive and car equipment divisions were putting out, but they wasted no time in withdrawing the anti-airline propaganda from circulation. We commend GE for its fast action.

Southwest's Record

TO THOSE who believe that local service airlines will always be in the subsidy category, Southwest Airways can say, "Hold on, look at us."

The steady progress by this pioneering Californian feeder in reducing its dependence on mail pay is one of the transport industry's real post-war success stories. For the month of September, in fact, it could be said that Southwest got out of the subsidy class and its record for the third quarter is something to shout about.

In 1947 when Southwest began its aerial-trolley service to 25 cities spaced an average of 75 miles apart, it had a break-even mail pay need of 60c per mile. The government paid almost twice as much to it in mail pay as it took from passengers. In the next two years the break-even mail pay need dropped sharply first to 43c per mile and then to 32c.

But this year, even with increased flying and higher operating costs, Southwest has begun to establish some historic records for local service airlines. For the first nine months the break-even mail pay need was 27c, but in July, August and September the figures were 19c, 12c and 10.6c respectively, or an average of 13.9c for the third quarter. This is getting mighty close to a compensatory service rate.

Southwest believes it is well on the way to getting out of the subsidy class on a year-round basis. It has converted two of its 24-passenger DC-3's to 27-passenger planes and next year will convert the remainder of its fleet to 28-passenger planes. It has installed its own radio ranges and homing stations at a number of points to increase dependability of service. It will increase its fare structure from 5.1c per mile to 5.7c per mile in January.

Of special interest is Eureka, Calif., the most fog-hidden city in the country, where Southwest has operating approval of 100 feet and ¼ mile (only such minimums in the U. S.). The airline has passed up the airport only four times since the approval was granted August 16, 1949. And in September it carried 2,500 passengers in and out of this town of 26,646. That's good business—and excellent dependability.

School for Travel

OUR CONTACTS with travel agents have been sporadic and we wouldn't pretend to be an expert in their field. But we have the impression that there is a very lucrative field available to travel agents if the profession, if it can be called such, could be lifted to a higher level of selling and education.

The travel agent is important to the airlines, especially in the international field. He serves, or can serve, a very useful purpose in developing new business and making travel easier for his customers. It is a challenging and profitable field. But something is missing in it, something that would broaden the scope of both profits and opportunity.

The field of hotel management was unprofessional until Cornell University made a course out of it and trained people to become hotel managers. We think the same thing needs to be done in the field of travel management. It would be worthwhile for the airlines, and other transportation media, to persuade a leading university to build an entire course for the purpose of training people how to become travel agents. Too many agents enter the field because it's relatively easy and they sit around waiting for business to come to them, instead of participating aggressively in the job of getting more people to travel. It's a specialized business waiting for proper guidance and leadership.

WAYNE W. PARRISH.

★

MOBILIZED, FOR PEACE OR WAR



BEING READY to aid the military forces is nothing new for the scheduled air carriers; to them it is only a matter of degree. Constantly we are becoming better prepared to provide the air transport element of National Air Power.

It is a matter of great pride that we of American Airlines, Inc. participated in the Hump Operation, over the Himalaya Mountains, from India to China; in the Berlin Airlift and, more lately, in the Korean Air-

lift. That experience and the tremendous capabilities of American Airlines, Inc. are and always will be available, for the important and difficult tasks ahead.

More than \$15,000,000 is now being expended by American Airlines, Inc. for new and better aircraft. In the Spring there will be a new fleet of larger and faster Flagships; to provide service for your requirements in time of peace and prepared to fulfill other obligations in time of emergency.

AMERICA'S LEADING AIRLINE **AMERICAN AIRLINES** INC.

B.F. Goodrich



Lifeboat's rubber lungs let passengers breathe easier

THE AIR FORCE's newest way to rescue survivors at sea is to drop them a lifeboat. Designed to be slung under the belly of a plane, the new A-3 airborne lifeboat carries provisions for 15 men, is motor powered, has a 600-mile cruising range. When it's cut loose from the plane, it floats down to the water on a 100-foot parachute.

But the boat had to right itself if it hit the water bottom-up, be capsize-proof in the heaviest seas. The rubberized covering at bow and stern had to be strong enough to stand the blow when the 3,300 lb. boat first dives into the water, sturdy enough for the men

to stand on.

Designers at Wright Field and Edo Corporation knew what they had to have for the job . . . if it could be done. But coming up with enough rigidity and strength with complicated curves in an *inflatable* design was a problem. B. F. Goodrich engineers found a way to do it. While the boat is attached to the plane, these B. F. Goodrich self-righting chambers are packed down out of the way to let the boat nestle snugly against the plane's belly. When the release cable is pulled, bottled carbon-dioxide automatically inflates the lung-like chambers to form a rigid structure

at bow and stern. These chambers are flexible enough to inflate quickly and easily, yet strong enough to hold up under impact. They make it impossible for the boat to turn turtle. They give survivors the shelter they need. They're typical of B. F. Goodrich engineering for aviation which, combined with BFG research, provides effective answers to many tough problems in the industry. *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

B.F. Goodrich
FIRST IN RUBBER

Winter-proofing airline operations

NEW ELECTRONIC AIDS

VISUAL AIDS

PROCEDURE SPEED-UPS



By WILLIAM D. PERREAULT

NEWLY installed aids to air navigation and traffic control promise to give the airlines the best winter's operation in their history. Sharp reductions in the percentage of scheduled miles cancelled because of weather can be expected, with the coming winter travel swelling the record airline earnings already recorded during the first nine months of 1950.

New operational procedures will also play an important part in speeding up traffic on the nation's airways for both the airlines and the military services. To the military services the equipment and procedures growing out of the RTCA SC-31 report will mean substantially greater airway and airport capacity. It will contribute to training activities and other non-tactical operations and create new domestic air lift potential for any national emergency.

Since 1946, when 4.26% of the scheduled mileage of the trunk airlines was cancelled, scheduled-mile cancellations had been cut almost in half by 1949. This was accomplished largely by the use of the Instrument

Landing System and Ground Controlled Approach system coupled with improved operating procedures. During the 1950-51 season cancellations may well be cut in half.

Based on 1949's operation, a 1% reduction in scheduled miles cancelled meant 3¼ million airplane miles. Multiplied by the number of seats per airplane and the fare per passenger-mile this adds up quickly.

This will emphasize that the airlines are being "winter-proofed" by electronic and visual aids installed since the spring of this year. These include:

- **GCA**—Eight new sets of Gilfillan surveillance and precision approach radar will be operating this winter. Already in operation are sets at Boston, Atlanta, New York, Chicago, Cleveland and Los Angeles. Two other installations now under way, at Washington, D. C., and New York International Airport, will be completed soon. Three sets of war-time radar, the only units in commercial domestic use last winter, will be operating at Newark, Minneapolis and Oklahoma City.

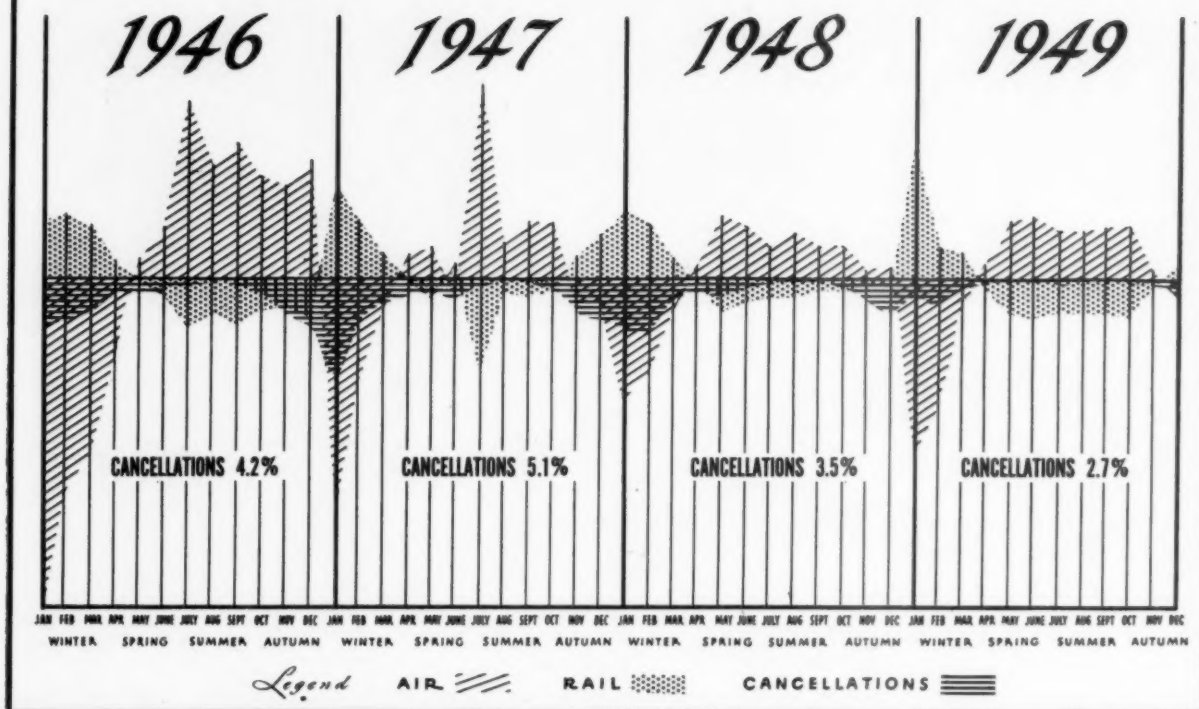
- **Hi-Intensity Approach Lights**—Six new installations have been commissioned, 15 are under way and nine more assigned but not yet under way. Four of these, at Washington, Los Angeles, New York and Arcata, are slope-line systems.

At Newark construction is under way on a trial installation of a system meeting the recommendations of the Air Line Pilots Association, a single row of slope-line units on the runway centerline extended. The remainder, with the exception of the Westinghouse system in Cleveland, are left-row ladder systems using slope-line lighting fixtures.

CAA recently adopted red lenses to be used over the sealed-beam white lights in all slope-line fixtures.

- **Omni-Ranges**—With 276 omni-directional radio ranges now commissioned, CAA recently approved the first complete omni-airway (AMERICAN AVIATION, Oct. 30, p. 44). The 4,380-mile system covers the entire route structure of Continental Air Lines. Work is moving ahead on other omni-airway approvals with segments of Trans World Airlines' and

IMPACT OF WEATHER on PASSENGER ACCEPTANCE



THIS CHART, originally prepared by the Air Transport Association, shows the impact of weather on passenger acceptance. The center horizontal reference line on the chart is considered "average" travel level. Note that rail travel gains or loses in direct relationship to airline travel. The increase in scheduled

mile cancellations during winter months is reflected in reduced acceptance of air travel and consequent air travel slumps. The leveling out of the chart peaks in recent years, except in the winter of 1948-49 when equipment grounding distorted the trend, reflects improvements in airline "winter-proofing."

Braniff's routes next on the list. Several more omni-airways will be in operation before the winter is out.

• **ILS**—Even in 1948 and 1949 the airlines benefited materially from lower IFR minimums made possible by the instrument landing system. Now 171 ILS systems have been completed and the program is virtually finished. At one airport, Arcata, Calif., minimums have been lowered to 100-foot ceiling and ¼-mile visibility. At 42 other air-carrier airports minimums are down to 200-foot ceiling and ½-mile visibility.

• **Mechanical Interlocks**—These units, which minimize communications contacts between the air route traffic control center and the control tower by providing a system of warning lights denoting airspace utilization, have been installed at Boston, Buffalo, New York (2 units), Philadelphia, Pittsburgh and Los Angeles. Other installations are proceeding as deliveries are made by the manufacturer, General Railway Signal Co.

• **Direct Communications**—Facilities

to permit direct communications between the air route traffic control center and the aircraft have been installed at Chicago, New York, Atlanta, Washington, Los Angeles and Salt Lake City. The procedure, which effectively reduces the communications load and steps up traffic control handling, was in use only at Washington and Chicago last winter.

Some additional installations, already approved, will also be in use before the winter season is over at Seattle, Boston, Kansas City, San Antonio, Pittsburgh, Cleveland, Detroit and Cincinnati.

• **DME**—The first installations of Federal Telephone & Radio Corp. built distance measuring equipment will be installed within a few weeks. All but one of the 16 units in this order will be installed on the Chicago-New York route. The other one will be installed at Oklahoma City for training purposes. None of the 400-odd Hazeltine DME units will see service this winter. Regular deliveries will not start until November, 1951.

• **Voice Markers**—CAA has funds for

five voice-type marker beacons to be used at points where the patterns of two fan markers overlap resulting in possible confusion to the pilot. The voice marker orally identifies the marker on a continuous basis. Exact location of these units has yet to be decided but installations are simple and will see service this winter.

ILS-GCA Role

The part played by ILS and GCA in this coming season, as in past years, cannot be over-emphasized. Unlike the remainder of this equipment, ILS and GCA predate the "Common System" provisions of the Radio Technical Commission for Aeronautics. Nonetheless, the RTCA program is directly responsible for the state of implementation of these units. Without the industry agreement and the unparalleled cooperation promoted by RTCA these systems would still be in their infancy.

The following charts showing the percentage of scheduled airline mileage cancelled in recent years stresses the achievements of these units. Note that in 1946 ILS was not standard

equipment. In succeeding years it came into widespread use.

Percentage of Scheduled Miles Cancelled

Trunk Airlines

	1946	1947	1948	1949
January	9.52	19.20	9.04	13.54
February	6.01	7.02	11.21	4.27
March	3.95	5.31	4.44	1.30
April	0.96	4.02	1.70	0.71
May	3.22	3.37	2.27	0.70
June	2.28	2.43	1.13	0.26
July	1.76	1.24	0.86	0.52
August	1.21	0.90	0.89	0.87
September	2.12	1.56	1.22	0.68
October	3.52	2.86	1.66	1.62
November	6.89	7.17	4.30	1.67
December	9.52	7.67	5.59	6.77

Note also that in 1946 there was only one month in which cancellations were less than 1% of scheduled mileage. By 1949 six of the months showed less than 1% cancellations. Yearly cancellations had dropped from 4.26% in 1946 to 2.74% in 1949.

During 1949, 64% of the rail Pullman-air dollar was spent on business travel, 36% on personal travel. The airlines captured 65% of the business dollar and 33% of the personal dollar spent on this class transportation.

Figures compiled by the Air Transport Association indicate that \$96 million more revenue could be diverted to the airlines if only 15% more of the business dollar and 10% more of the personal travel dollar

LAST MONTH the Air Coordinating Committee conducted full-scale tests at Wright-Patterson AFB which proved conclusively that present-day equipment can be used to conduct 40 operations (takeoffs and landings) per hour off a single runway. These tests, which will be repeated for industry review in February, proved the practicability of mixing conventional transports, jet fighters and bombers and light airplanes in a common control operation.

Washington, D. C., the nation's number-one traffic control bottleneck, will be the first city to reap the benefits of the Wright-Patterson tests. As soon as equipment can be gathered, probably early in December, all the aids used in the recent tests will be placed in operational use at Washington National Airport.

In addition to standard equipment (see adjoining story) now installed or under way at Washington, the program calls for two more new items of equipment: Skiatron and automatic identity

transfer. **Skiatron**, a Navy development, is a "king-size" radar repeater scope. It is about three feet in diameter and presents an enlarged radar presentation to the controller in which aircraft appear as red pips many times larger than on conventional scopes.

Automatic identity transfer equipment is a companion piece to the mechanical interlock. When an aircraft is first assigned an altitude and placed on the interlock boards, it is assigned an identification number. The pilot is given this number and it appears on the identity transfer unit alongside the interlock panel. Each time the aircraft is given a clearance, laddering it down, the identification number automatically follows without additional effort on the part of the controller or pilot.

Washington will not be the proving ground. The equipment has already proved itself. Washington will be the first full-scale application of all these advanced type aids for routine operations.

Washington, Control Bottleneck, To Get First Use of New Aids

\$86 Million in ECA Money Spent for Aircraft, Parts

More than 86 million dollars has been or is being spent with U. S. aircraft engine, propeller and spare parts manufacturers under the ECA program since its inception April 3, 1948.

The total authorizations under the program since its beginning amounted to \$9,796,000,000 of which \$86,500,000 was allocated for purchases within the aircraft manufacturing industry.

Much of this business came as a shot in the arm for the aircraft industry at a time when commercial and military contracts were at a relatively low ebb. Today, ECA procurement authorizations are causing a problem because military orders have preference through DO (Defense Order) ratings.

The following table shows the authorizations cumulative from April 3, 1948, through September, 1950:

U. S. Purchases of Aircraft, Parts and Accessories	
Country of Destination	
France	\$47,200,000
Netherlands	27,800,000
Italy	4,900,000
Belgium-Luxembourg ..	3,700,000
Norway	1,000,000
Denmark	800,000
Greece	700,000
Portugal	200,000
Sweden	200,000
Total	\$86,500,000

WHAT CANCELLATIONS COST :



DESPITE the fact that the airlines penetrated deeper into the total rail Pullman-air market in 1949 than ever before, losses due to cancellations during the peak year were \$2 million less than in 1948. On a percentage basis, reflecting the higher 1949 traffic, the airline losses due to cancellations would have been substantially greater than in 1948.

2100 R.P.M.
 $\frac{2}{4200}$ strokes per min.
 123,000 piston strokes

every second

24 hrs.
 $\frac{60}{1440}$ min
 $\frac{60}{86,400}$ sec. per day

lubricated by

3524 DC-6
 896 DC-4
 $\frac{2664}{7088}$ CV pistons

49
 74
 13
 $\frac{3}{139}$ planes

SINCLAIR!



SINCLAIR REFINING

SINCLAIR

Yes, every time a second ticks by, pistons in the engines of American Airlines' Flagship Fleet plunge up or down some 123,000 times, or 7,380,000 strokes a minute! This goes on day in, day out. Thus, you can appreciate how vital the problem of piston wear is to this great airline . . .

Without interruption for over 15 years now, American Airlines has entrusted this lubricating job exclusively to Sinclair. Only SINCLAIR AIRCRAFT OIL is used to safeguard pistons, cylinder walls, and other parts of these engines from damaging wear.

Take a tip from American! For safe, dependable aircraft engine lubrication with less frequent overhaul and replacement, rely on highly-refined SINCLAIR AIRCRAFT OIL. It pays!



COMPANY Aviation Sales, 630 Fifth Ave., New York City

GE Unveils More Powerful J-47 Models

By JAMES J. HAGGERTY, JR.

GENERAL Electric Co.'s Aviation Gas Turbine Division is now getting thrust ratings in the neighborhood of 6,500 pounds dry and up to 8,000 pounds with an afterburner out of late models of the J-47 jet engine, it was learned, as GE unveiled two new models of the J-47 at a press conference at Lynn, Mass., home of the Aviation Gas Turbine Division.

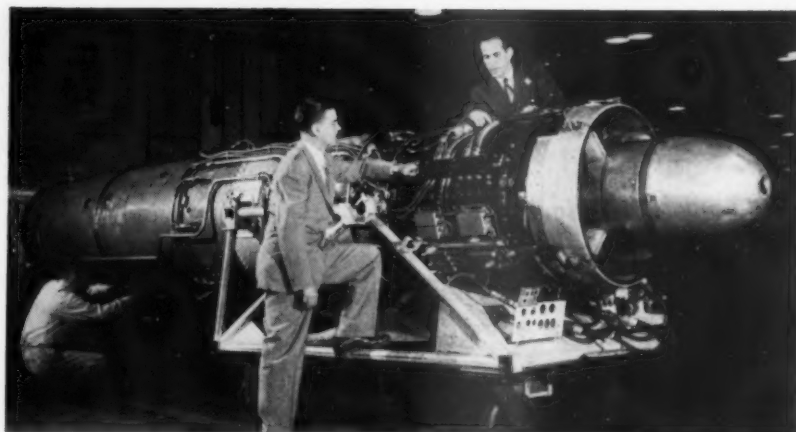
Officially, however, neither GE nor the Air Force will confirm the thrust ratings. The only figure they would release was a rating "in excess of 5,200 pounds," a rating now almost two years old. The officials smilingly admitted the actual thrust ratings were "considerably" in excess of 5,200 pounds, but declined to disclose the latest thrust guarantee because of an Air Force "security" policy which demands that a plane powered by the engine be in operational service with the USAF before the thrust guarantee of the engine may be released. Neither of the two engines shown at Lynn is yet in an operational plane.

Six-Foot Afterburner

The most powerful of the new models shown is the J-47-GE-17, equipped with a six-foot afterburner which "reheats" the exhaust gases and unburned fuel coming out of the basic turbine and thereby provides an additional 20-25% thrust. The -17 engine, which is the installation to be used on the swept-wing North American F-86D fighter, also features a hot-air bleed system which prevents icing of the air intake and a greatly reduced strategic material content.

In the anti-icing system, hot air from the engine's compressor is bled to hollow parts of the nose, such as the air inlet guide vanes, fairings and support struts. Temperatures are high enough to melt any ice crystals which might form, an important factor in high-altitude operation, where intake icing can block the passage of air to the turbine and "kill" the engine.

Strategic metals are those in short supply, or those which would be scarce in an emergency. In its -17 engine, GE is trying, on a production basis, a system originated by the National Advisory Committee for Aeronautics—the substitution of metals in plentiful supply for the more critical materials. In the -17, and to a lesser extent in the other new model, the J-47-GE-23, GE has



THIS LATEST development of the General Electric J-47 jet engine series—the J-47-GE-17, is scheduled for installation in the North American F-86D fighter. With the six-foot afterburner, it develops in the neighborhood of 8,000 pounds thrust.

substituted new metals (which officials could not talk about), for such critical materials as tungsten, cobalt, cadmium, etc., without any loss of engine thrust.

Inlet Screen Retracts

The -17 has another new feature, a retractable air inlet screen. The screen is used during ground operation to keep foreign objects from being sucked into the turbine, but in flight it hampers slightly the flow of air into the intake. So the retractable screen was developed; shortly after takeoff the pilot hits the retracting switch and the screen, which is split

into several sections, flattens itself against the outer casing of the engine.

The -23 engine is basically the same as the -17, having the anti-icing hot air bleed system, the lower strategic metal content and the new retractable screen. However, it has no afterburner. Both engines are considerably more powerful than the types now coming off the production line, the added power having been obtained by a "compressor alteration" about which officials couldn't talk. Both engines are just now going into production; about three or four of each have been completed.

Lab Dedicated

The Lynn press tour took two days. On the first day (Tuesday, Nov. 14) the press and members of the Air Force inspected GE's Dr. Sanford A. Moss Aircraft Gas Turbine Laboratory and the laboratory was formally dedicated to the memory of Moss, father of the turbosupercharger and one-time Collier Trophy winner, by GE president Charles E. Wilson.

On the second day the group toured GE's two engine plants in the Lynn area: the Everett plant, where components of the J-47 are manufactured, and Lynn, where they are assembled. Everett has 279,000 square feet of floor space and Lynn has 737,000. There is a third plant in the Aviation Gas Turbine Division, the Lockland, O., plant, which has 678,000 square feet of floor space and which assembles J-47 parts supplied chiefly by subcontractors. Total personnel in the AGTD is about 7,700.

Rentzel Keeps In Touch

In the interests of saving time, CAB Chairman D. W. Rentzel has had installed in his automobile a two-way radio which enables him to receive and send messages while enroute to various meetings or conferences in the Washington area. It makes it possible for the chairman to keep in touch with the Board, to be advised of last-minute changes affecting his schedule or to be acquainted with new developments since leaving his office. The radio is tuned to the Chesapeake and Potomac Telephone Exchange which connects the chairman's radio call with designated telephone numbers.



23 COMPANIES SEEK ORDER:

USAF Liaison Competition Attracts Lightplane Entries

The Air Force's new liaison plane competition, scheduled to start Dec. 4 at Wright-Patterson Air Force Base, Dayton, O., is exciting quite a bit of interest among lightplane manufacturers, as 23 companies have now signified intention to compete. The prize is a production order for "more than 40 planes"; but, more than that, it gives the winner a plane type in USAF service and therefore the probability of future orders well in excess of the original 40 or more.

Generally, what the Air Force

wants is a liaison plane which can carry a pilot and three passengers or a comparable load in litter patients or cargo. It must be able to operate at night, under limited instrument conditions, have a radius of action of 220 nautical miles and a cruising speed of at least 110 miles per hour with an endurance of at least five hours at that speed.

The list of competitors covers just about everyone who builds a lightplane, with one notable exception. Consolidated Vultee Aircraft Corp., whose L-13 is now in service with the USAF as a liaison plane, has not (at press time) declared its intention of competing.

Here is a cross-section of the companies entered and the plane types they are offering:

• **Ryan Aeronautical Co.** is entering a Lycoming-powered 1951 model commercial Super Navion with special military modifications (see cut).

• **de Havilland Aircraft of Canada Ltd.** will participate with a DHC 2 Beaver, a single-engine, high-wing monoplane powered by a Pratt & Whitney R-985 450-horsepower engine. The Beaver, favorite of Arctic flyers, has a wing span of 48 feet, a length of 30 feet and weighs 2,800 pounds empty.

• **Bellanca Aircraft Corp.** will show its Model 31-42 Senior Pacemaker, a single-engine, high-wing monoplane also powered by the P & W R-985. It spans 50 feet, is 28 feet long and weighs 2,954 pounds empty. It has a cabin capacity of 180 cubic feet and a fuel capacity of 200 gallons.

• **Helio Corp.** is preparing a special

Liaison Entry—One of the entries in the Air Force's liaison plane competition—the Ryan 1951 Super Navion. Ryan will enter this plane with military modifications.

military model of its Helioplane since the military specifications require a heavier, higher-powered plane than the commercial Helioplane Four. The new model will preserve the slow flight and non-stalling characteristics, together with the ultra-short field performance of the commercial Helioplane. The new model is now being developed and details are not yet available.

• **Montagu Aircraft Corp.** will submit a slightly modified stock lightplane, the only change being a step-up in power to 125 horsepower. Other contemplated changes will not be made until after the competition.

• **Goodyear Aircraft Corp.** may enter its GA-22 amphibian, a modified version of the Duck. The GA-22 is a four-place monoplane powered by a 185-horsepower Continental pusher engine mounted on top of the fuselage. The company is listed by the USAF as an entry, but Goodyear advises it has not reached a decision as to whether to compete.

The other companies in the competition either have not compiled specifications of their plane or decline to release them for competitive reasons. The remaining entries are Taylorcraft, Inc.; Cessna Aircraft Co.; Fletcher Aviation Corp.; Piper Aircraft Corp.; Aero Design and Engineering Corp.; Monocoupe Airplane and Engine Corp.; Meyers Aircraft Co.; Mooney Aircraft, Inc.; Aerobat; Aquaflyght; Mallard Air Service, Inc.; Emigh Trojan Co.; Anderson, Greenwood & Co.; Regent Aircraft Corp.; Bush Aircraft Corp.; Atlas Aircraft Co.; and Aeronca Aircraft Corp.

Performance Specs USAF Liaison Competition At Design Gross Weight

	Desired	Minimum Acceptable
Takeoff over 50-ft. obstacle (without assist)	500 ft.	800 ft.
Landing over 50 - ft. obstacle	500 ft.	500 ft.
Rate of Climb (First Minute)	1,250 ft.	1,000 ft.
Maximum endurance	6 hrs.	5 hrs.
Lowest Speed with Full Control and Constant Altitude	35 knots	50 knots
Cruising Speed (not over 75% power)	130 knots	110 knots
Service Ceiling	18,000 ft.	15,000 ft.
Radius of Action at Cruising Speed (nautical miles)	300	220



E-x-p-a-n-s-i-b-l-e—Shown here is the new expandable ladder developed by Fairchild for the XC-120 Packplane. The cockpit of the cargo plane is about 15 feet off the ground. The 29-pound ladder is only three feet long when collapsed but extends the full 15 feet. Special hooks on the end of the ladder fit any of ten pairs of keyhole slots located near fins, rudder, tail booms, oil tanks and windshield.

Should Mail-Pay Rates Be Tied to Prices?

By WILLIAM V. HENZEY

A CRITICAL problem facing the Civil Aeronautics Board is that of determining the rates of mail compensation to be paid to domestic and international airlines. Rapid growth of the industry, new equipment, route pattern changes, and price and wage fluctuation, contribute chiefly to the problem, and result in the inadequacy of yesterday's rate today and today's rate tomorrow.

It is, of course, not only a CAB problem, but one of great concern to the airline industry whose financial structure stems from the government outlay of mail funds to a degree governed, largely, by the size of the carrier and the amount of non-mail business it does.

It's true that officials of CAB and the industry have worked cooperatively so that airlines, in the long run, receive, as closely as yet has been found possible, just rates for "honest and efficient" management operation. At the same time, the taxpayer, from the overall viewpoint, contributes justly to the extent Congress contemplated he would for his part in the development of a national air transportation system and the air mail privileges that are his.

Problem of Adjustment

The real problem, therefore, is the adjustment of month-to-month payments which may be over or under the cost to the carrier and which present rate formulas do not relate directly to the level of prices airlines pay for labor and materials, except through retroactive adjustment.

This sometimes forces airlines to resort to interim emergency financing or sometimes finds the Government paying more than necessary for the service, before eventual modification is made on a retroactive basis.

As one possible solution to this problem, John Howard Payne, Washington consulting economist, has devised a price index which, he points out, can be used to keep compensatory air mail rates in line with changing conditions affecting airline operations.

Reflects Price Changes

It reflects the changes in prices that airlines pay for labor, gasoline and oil, aircraft and engine maintenance materials, and other commodities or approximately 75 to 80 per cent of their total operating expenditures.

Not included initially are rents, insurance, airport charges, legal fees,

or miscellaneous expenses, such as telephone, travel, etc. Some of the more important of these, however, may be included at a later date.

Payne would tie mail rates to the price index so that the rates would be automatically adjusted to correspond to price changes reflected by the index. This, he reasons, would keep mail rates on a current basis and would avoid long procedural delays.

In theory, the total mail pay received by an airline over an extensive period of time under the price index system would be practically equivalent to the amount received for the same period of time under the present basis of periodic adjustment. It would, Payne said, mean simply that the going rate would more closely approximate costs under the price index system.

Volume Lowers Rate

For example, he points out, United Air Lines' present 75c ton-mile block rate decreases as volume increases, with the result that for the quarter ending December 31, 1949, United was actually receiving about 56c per ton-mile carried, while for the quarter ending March 31, 1948, United was receiving 63c per ton-mile. (Both figures exclude added payments for grounding expenses, etc.) This decrease took effect despite higher salaries, wages and materials.

However, had United's rate been tied to the index in 1948, when the block rate was put into effect, it would have received approximately 65c a ton-mile in the quarter ending December, 1949, instead of the 56c it was getting, since the index increased about 15% from early 1948 to December, 1949.

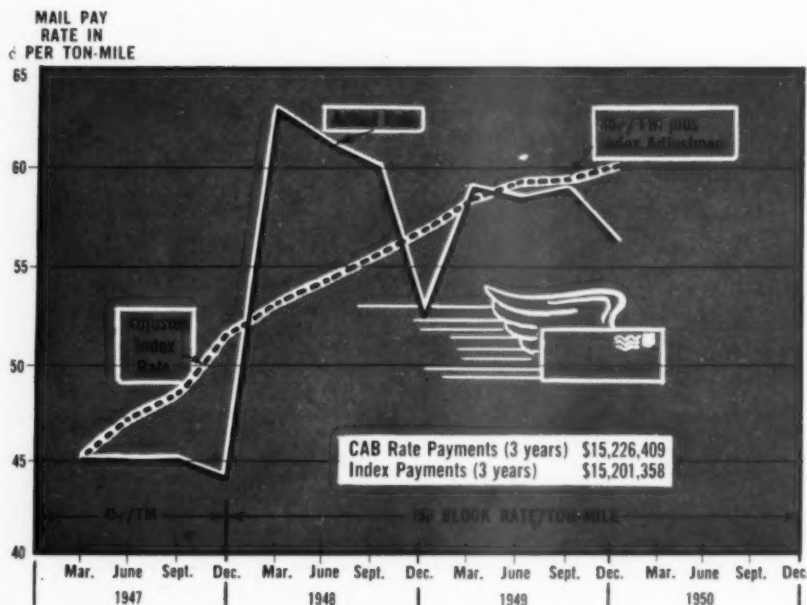
This amounts to needed protection for the airlines, Payne says. The block rate system gives the Government the advantages of economies realized from increased volume of mail but, the economist argues, it affords no protection to the airline from the higher prices it has to pay in order to perform the same amount of service.

Applies to Fixed Rates

The index is designed also to apply to fixed mail rates and so-called "incentive" rates. Under a fixed rate, a carrier is paid a specified rate per pound or per ton-mile which is not given to fluctuation either by volume carried or by cost adjustments.

Payne shows that a fixed 45c ton-mile rate received in 1947 would, had it been tied to the index, increased smoothly in keeping with changes in amounts paid for wages and materials. Result, based on the index increase, would have been a 61c rate in December, 1949. (See accompanying chart.)

The "incentive" formula is designed to provide a maximum mail rate at



ACTUAL AIR MAIL rates paid United Air Lines by the Civil Aeronautics Board from 1947 through 1949 compared with 45c per ton-mile rate adjusted by changes in the price index of airline-bought commodities and services.

a minimum load factor with the mail rate decreasing as load factor increases. It results in a carrier receiving more total revenue per flight if it pushes up its load factor.

The index can be applied to such a formula, Payne says, by relating it to the differential so as to reflect the increase cost to the airline of labor and materials it must buy.

Service Rate Application

Then too, the "service" rate contemplated by present subsidy-mail pay separation studies would be a natural for the index, according to Payne. Such a rate, he says, will be a true service rate only so long as prices remain unchanged. Any significant change in prices, however, will make the service rate either partly a subsidy, or only partly compensatory.

Automatic adjustments contemplated by the price index, the economist says, would tend to stabilize an important element of income in line with operating costs and do away with the "stigma of dependence on a hand-out."

Moreover, if the index is the an-

swer, airlines could save large expenditures and the embarrassment of periodic appeals for increased mail payments.

It has other uses too. It could be an aid to airline executives in achieving economies and in administering more efficiently the operation of the company. Also, it may be useful to personnel managers in maintaining stable labor relations, to purchasing agents in keeping prices paid by the company in line with markets, and to those concerned with tax questions.

But chiefly it is aimed at the mail rate problem and its effect, after practical application, could be substantial. The index is published by American Transportation Research, Inc., 1627 K Street, N.W., Washington, D. C.

ALPA Dedicates Building

The Air Line Pilots Association's new headquarters building adjacent to Chicago Municipal Airport was formally dedicated at the recent ALPA convention in that city. Building will be ready for occupancy sometime in February.

American Aviation Announces Annual Engineering & Maintenance Awards

TWO AWARDS of \$100 each, plus commemorative plaques for the winners, will be made by AMERICAN AVIATION magazine to engineering and maintenance personnel for recent outstanding contributions to airline operations. The awards will be made at the annual Engineering and Maintenance Conference sponsored by the Air Transport Association in Chicago, Ill., on April 24-26.

The Engineering Award, to be presented for the first time this year, will be made to an engineer representing an airline or manufacturer who has made the most outstanding contribution to airline operations during the post-war period. Entries will be accepted from the airlines, the manufacturers or any individual (on his own behalf or that of a fellow employee) submitting all the facts.

The Maintenance Award will be made to the airline maintenance man credited with the outstanding contribution to airline maintenance during the calendar year 1950. This award will parallel that made during the Engineering and Maintenance Conference last year. As

in the case of the engineering award, entries will be accepted from airlines manufacturers or any individual submitting all the facts.

Both awards are applicable to the design of any new device, system or procedure which contributes to airline operating efficiency or safety. Entries will be promptly acknowledged. They will be judged by a three-man board of judges, selected from representative industry groups, on the basis of originality, economies experienced, safety aspects, applicability to other airlines and personal initiative involved in completion of the project.

Although entries are encouraged from individuals (last year's award was based on such an entry), AMERICAN AVIATION urges that every airline and manufacturer submit at least one official company entry. Entries will be judged primarily on the basis of the submitted record, but AMERICAN AVIATION reserves the right to check with appropriate sources to verify any of the data submitted. Entries must be received by February 15, 1951.

Aviation Calendar

Nov. 27-Dec. 1—American Society of Mechanical Engineers annual meeting, Hotel Statler, New York, N. Y.

Nov. 28—Air Cargo Day, in conjunction with ASME meeting, Hotel Statler, New York, N. Y.

Nov. 29-Dec. 1—Aviation Distributors and Manufacturers Ass'n 8th annual meeting, Hotel Statler, New York, N. Y.

Nov. 30—Airport fire safety clinic, sponsored by the Committee on Aviation and Airport Fire Protection, National Fire Protection Ass'n, Baker Hotel, Dallas, Texas.

Dec. 16—Institute of the Aeronautical Sciences 14th Wright Brothers Lecture, U. S. Chamber of Commerce Auditorium, Washington, D. C.

Dec. 16—Wright Brothers Memorial Dinner, Statler Hotel, Washington, D. C.

Jan. 2-7—Miami Aviation Week, Miami, Florida.

Jan. 6-7—Annual Miami Air Show, Opa Locka Airport, Miami, Florida.

Jan. 8-10—8th annual Miami-Havana air cruise.

Jan. 8-12—Society of Automotive Engineers annual meeting and engineering display, Hotel Book-Cadillac, Detroit, Michigan.

Jan. 22-26—American Institute of Electrical Engineers winter general meeting, Hotel Statler, New York, N. Y.

Jan. 28-Feb. 1—Institute of the Aeronautical Sciences 19th annual meeting, Hotel Astor, New York, N. Y.

Feb. 14-16—National Aviation Education Council meeting, Atlantic City, New Jersey.

April 16-18—Society of Automotive Engineers aeronautic meeting and aircraft engineering display, Hotel Statler, New York, N. Y.

April 19-21—Airport Operators Council annual meeting, Hotel Peabody, Memphis, Tennessee.

April 23-26—American Association of Airport Executives annual meeting, Minneapolis, Minnesota.

April 24-26—Air Transport Association annual engineering and maintenance conference, Drake Hotel, Chicago, Illinois.

May 23-24—American Society for Quality Control fifth annual convention, Hotel Cleveland, Cleveland, Ohio.

May 24-25—Society of the Plastics Industry annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 3-8—Society of Automotive Engineers summer meeting, French Lick Springs Hotel, French Lick, Indiana.

June 18-22—American Society for Testing Materials annual meeting, Atlantic City, New Jersey.

Sept. 10-14—Instrument Society of American sixth national instrument conference and exhibit, Sam Houston Coliseum, Houston, Texas.

International

Jan. 2—ICAO Legal Committee meeting, Mexico City.

Feb. 13—ICAO Airworthiness Division meeting, Montreal.

Feb. 20—ICAO Operations Division meeting, Montreal.

April 3—ICAO Communications Division meeting, Montreal.

March—World Meteorological Organization Congress, Paris.

June—1951 Paris International Aircraft Exhibition, Grand Palais and Paris airport, Paris.

Inter-Service Rumblings

By James J. Haggerty, Jr.



UNIFICATION, that catchword of the Louis Johnson regime in the Department of Defense, is running into a lot of trouble these days, now that Looie's bludgeon is missing from the defense scene. Once more able to speak their minds on controversial subjects, top officers in Defense are doing so and a rash of squabbles between the various branches of the service is breaking out.

There are a number of minor differences between the services, few of which are of general interest, but there are two major battles brewing which threaten to knock the props out of unification and which bid fair to capture a lot of public attention in the next few months. The Air Force, which appears to have a curious penchant for attracting controversy, is involved in both of them.

Ground Support

The first of these is the tactical, or ground support, air power problem, which concerns the Army and the Air Force. Ever since unification, there has been a faction in the Army which felt that the Army didn't get a fair shake out of the unification law. Specifically, they feel that there should have been some provision in the law for Army employment of air power in the same manner that the Army uses artillery. The extremists in this faction believe that the Army should have design, procurement and operating control of certain types of aircraft—in effect, a third air force. The more conservative members of the group feel that it would be all right for the Air Force to buy and operate the planes, as long as the Army had something to say about their design and how they should be used in combat.

Korea gave this faction a wonderful opportunity. Even after all the propaganda has been sifted down, there can be little doubt but that the Air Force was something less than effective in providing ground support in Korea. This is aside from the early nonsense about the inadequacy of jet aircraft and their inability to hit targets because they were "too fast"—that story has been pretty well exploded.

The Air Force's shortcomings were lack of training in ground support work for the jet pilots and the absence of an effective system of ground control, that is, a system whereby an officer on the ground with the troops directs the aircraft to a target he wants eliminated. The USAF used a system whereby "mosquito" planes (usually North American T-6's) hovered over a target area, picked out targets, then contacted a flight of jets and directed them to the targets. This makeshift system obviously wouldn't work very well if the enemy had air cover, since the "mosquitos" are highly vulnerable.

The Air Force has reams of figures showing what the jets of the 5th Air Force accomplished in Korea, and it's impressive—so many tanks, trucks, other motorized vehicles and troops destroyed by tactical aircraft. But, in a lot of cases they were shooting up targets that presented no immediate threat, while other targets of immediate menace to our ground troops were neglected.

"Put it this way," a ground officer in Korea told this reporter. "We're trying to take Position X and the Reds have four tanks in that position that we have to knock out. Overhead we can see a flight of planes. They fly right by us and go forty or fifty miles behind the

lines and shoot up, maybe, four other tanks. That helps, of course. But what we'd like to have is some way of getting them down to shoot up the tanks in Position X right now. We'll worry about those behind-the-lines tanks tomorrow."

The Army wants a system something like that employed by the Marines, and very effectively, too, if we can judge by Korean results. The Marines employ a skilled pilot to work with the Marine ground troops. He works very closely with a target spotting plane, not a "mosquito" but a fighter, directing the spotter to the target the ground troops want knocked out, sometimes as close as 50 yards to the ground troops. The spotter drops a smoke bomb or identifies the target in some other manner. If he has spotted wrong, the ground controller tells him to try again. If he's right, the word is passed to the attacking planes in company with the spotter and they take it from there.

The Army wants that controller and the aircraft to work directly under Army control, so that aircraft can be employed in a fashion most beneficial to the advance of the ground troops and not just buzz about strafing haphazard targets of opportunity.

As we said, Korea gave the Army a wonderful opportunity. Armed with actual instances of ineffective air support in Korea, the Army has taken its case to Congress and a hearing on the subject of tactical air power will be held during the next session of Congress by Rep. Carl Vinson and his powerful House Armed Services Committee. It's up to the Air Force to work up some smart counter-propaganda between now and the time of the hearing or it might lose some of its prerogatives. We might conceivably even end up with the nucleus of a third air force. A more likely compromise, however, is that the Air Force will promise to set up a more efficient forward control system, emphasize training of its pilots in tactical work, and let the Army have a say in the design of tactical aircraft in the future.

Navy Air Transport

The second battle on the docket is between the Navy and the Air Force, and it concerns the problem of air transport. When the Military Air Transport Service was organized to fly air cargo or personnel for all the services, the Navy was permitted to keep an air transport organization known as the Fleet Logistic Air Wings to provide air transport for the seagoing fleets—MATS was supposed to provide all other Navy air transport.

Lately, however, the Navy has been grumbling that MATS is strictly an Air Force command, despite Navy representation in MATS' operating units. MATS, charges the Navy, is neglecting the Navy's transport needs. Consequently, the Navy is building up the Fleet Logistic Air Wings into what amounts to a rival service to MATS, a re-birth of the old Naval Air Transport Service.

The Navy is buying big, new aircraft like Douglas DC-6A's and Lockheed L-1049 Constellations for use by FLAW. FLAW's network of domestic routes, originally small, has mushroomed into a country-wide route pattern. It has expanded personnel-wise proportionately. The excuse for this expansion is that the Korean war caused an expansion of fleet activity. But FLAW was

in process of expansion before the Korean war started and its growth has been out of all proportion to the increased air logistic demands of a larger fleet, some observers note.

So, the Department of Defense has another problem on its hands. Can it stand by and watch the growth of a new military air transport service to rivals MATS or shall it precipitate a new inter-service battle by calling the Navy to task? There is no Congressional hearing scheduled for this argument yet, but some Congressional leaders have been acquainted with the problem.

It would appear that the solution to this argument lies in MATS original charter. According to the directive under which MATS was organized, MATS would fill the Navy's air transport needs in direct proportion to the amount of air lift and personnel the Navy contributed to MATS. Thus, if the Navy is not getting the lift it needs from MATS, all it has to do is contribute more planes (such as the new heavy transports it has on order) to the MATS pool.

The Navy's reply to this is that, while MATS would undoubtedly provide the additional lift under such an arrangement, the Navy would not get the priority on MATS air shipments that it requires, since MATS is an Air Force command and first priority goes to the Air Force.

So there's the line-up for the latest round of unification battles. It promises to be interesting, if annoying to the poor taxpayer.

INDUSTRY PERSONNEL

George H. Buchner has been named manager of the contract and order department of Curtiss-Wright Corp.'s Propeller Division, succeeding **Charles F. Farnsworth**, who had headed the department since 1942. Buchner joined the Propeller Division after service with Lockheed Aircraft Corp. and Douglas Aircraft Co.



Buchner

Joseph E. Stinson, assistant superintendent of manufacturing and night superintendent of Bell Aircraft Corp.'s Ordnance Division at Burlington, Vt., during the latter part of World War II, has been named general foreman of Bell's new Northland plant.

Winnett Boyd has resigned as assistant chief engineer and chief designer of Avro Canada's Gas Turbine Division to establish his own consulting engineering practice in Toronto.

PRODUCTION SPOTLIGHT

EMPLOYMENT in airframe and engine plants is now up more than 20% compared with the total at the beginning of the year, an AMERICAN AVIATION survey of 16 representative companies disclosed. The reporting companies had a combined employment total of 176,220 on January 1, 1950; the most recent figures available show a total of approximately 211,700. In some cases the current employment is only slightly higher than it was in January; in others it is up more than 35%. In two cases the current figure is lower than the January figure. These discrepancies are accounted for chiefly by the varying amounts of subcontracting doled out.

The following is a breakdown of the employment totals of the 15 reporting companies:

Company	Jan. 1, 1950 (approx.)	Now	Company	Jan. 1, 1950 (approx.)	Now
Allison	7,400	9,200	Lockheed	16,061	19,000
Boeing (Wichita)	9,362	13,500	Glenn L. Martin	7,400	9,500
Boeing (Seattle)	19,142	22,000	North American	16,619	19,300
Chance Vought	6,100	5,400	Northrop	6,583	8,500
Convair (Fort Worth)	16,897	23,000	Pratt & Whitney	14,996	17,500
Convair (San Diego)	11,130	13,000	Republic	6,000	6,000
Douglas	19,202	24,000	Wright	6,500	8,500
Fairchild	5,042	5,000			
GE (Turbine Divs.)	7,366	8,000	Total	176,220	211,700

Boeing Wichita, Boeing Seattle, Lockheed, Northrop and General Electric were not able to estimate future employment requirements for a variety of reasons. A survey of the remaining companies indicates that employment expansion is just getting under way—that total employment will go up at least another 25% between now and July 1, 1951 in the major airframe and engine plants. This, of course, is based on continuation of the presently authorized military programs and there is little reason to believe they will not be continued. There is a strong possibility that they will be increased and, if so, the labor total will skyrocket.

Here are the estimates of 11 of the companies in the survey of their future labor gains, based on continuation of their present programs:

Company	Now	July 1, 1951	Jan. 1, 1952
Allison	9,200	14,000	14,000
Chance Vought	5,400	7,000	No est.
Convair (Fort Worth)	23,000	23,000 ¹	No est.
Convair (San Diego)	13,000	13,000 ¹	No est.
Douglas	24,000	26,500	29,000
Fairchild	5,000	8,300	12,300
Martin	9,500	13,500	17,000
North American	19,300	23,000	23,000
Pratt & Whitney	17,500	27,500	27,500
Republic	6,000	7,500	8,000
Wright	8,500	12,000	12,000

¹ Employment at both Convair plants is expected to go up about 10% in the next few months, but it will fall off again by July 1, 1951 to about the present level.

As is obvious from the chart, some companies can handle an expanded program with only slight additional personnel while others will need as much as 60% more in the next seven months. The two chief reasons for this are varying degrees of expansion and varying amounts of subcontract work to be farmed out.

The shortage of skilled labor is now becoming critical. "The plant that reports no shortages of skilled labor is now the exception rather than the rule," the Department of Labor reports. "In every aircraft center, it is difficult to obtain the needed highly skilled workers. Aeronautical, mechanical, combustion and other kinds of engineers, tool designers, production planners, designers, draftsmen and layout men are some of the top-skilled workers reported as in very short supply."

Other skilled labor shortages in the industry include sheet metal workers, welders, machinists, metalworking machine operators, assemblers, technical writers and illustrators. Most plants, confronted with a tight labor market, have begun to soften hiring specifications—physical examinations are still required, but age limits are being raised; experience requirements are coming down; and even Rosie-the-Riveter is back in the picture, as some plants have already started hiring women and others are accepting applications for future consideration.

—J. J. H.

Undercarriage—Airborne Weight Parasite

By RICHARD G. WORCESTER

NEARLY all the weight of equipment in an airplane which plays no useful part in flight is accounted for by the undercarriage. The weight of the chassis, amounting to some 5% of the maximum weight or 30% of the payload, is an appalling burden to which must be added the increased weight of adjacent components which absorb and distribute the concentrated landing loads.

Except for the use of a skid for certain specialized military aircraft, there is no practical method yet devised for feather-bedding the airplane down without an undercarriage. This article, therefore, traces the attempts being made to make the chassis stronger, lighter and more efficient. The figures in the accompanying tables, for the most part never previously published, show a clear picture but not a complete one in the absence of rebound ratios and the ability of the gear to withstand sideloads.

Largest Undercarriages

The two largest civil landplanes with similar wheel grouping show that the Consolidated Vultee C-99's gear is heavier and slightly weaker than the Bristol Brabazon's. However, the weight figure drops below the Brabazon's at the C-99's new maximum weight of 315,000 lbs. The Brabazon's undercarriage weight will also drop when small eight-wheel

Transport Gears

Aircraft	Undercarriage % of gross weight	Vertical velocity of undercarriage ft./sec.	
Viking	3.8	12	
Apollo	4.1	13.8	
DC-6	4.2	10	
Viscount	4.2	12	
Convair 240	4.22	10	
Hastings	4.3	12	
DC-6B	4.3	10	
Hermes 4	4.35	12	
Marathon	4.37	9.68	H
Stratocruiser	4.4	10	
Brabazon I	4.52	11.5	
Ambassador	4.56	10.32	H
Dove	4.6	9.1	
Constellation 749A	4.7	12	
Bristol 170 Wayfarer	4.72	9.2	H
C-97A Stratofreighter	4.9	12	
Prince	5.22	9.78	H
Super DC-3	5.6	10	
C-99 (265,000 lb.)	5.87	10	
C-124A Globemaster II	6.8	10	
C-125 Raider	6.9	10	H

H—High-wing.

Bold Face—U. S. Aircraft.

bogies are used on the main legs instead of four. Neither of these two big aircraft has the relatively light undercarriages that might be suggested by the way undercarriages get comparatively lighter with increase in size. Evidently there comes a point

when the sheer size of the undercarriage components becomes an adverse influence. Thus the structural economies of the 100,000-lb. class of airplane over the 20,000-lb. type are not sustained in the very large sizes.

Comparing the various 150,000-lb. aircraft the Boeing Stratocruiser and Stratofreighter show some differences mainly because of the revised strength requirements in the military specifications. It is probably fairer to compare the Stratofreighter with the Douglas C-124A Globemaster II which is also a military transport powered by similar engines. There is no obvious reason why the Douglas undercarriage should be weaker, yet more than an edge heavier. A difference of only 1% of the gross weight in these large transports means half a dozen troops with equipment.

Smaller Civil Designs

The 100,000-lb. class is represented by the Douglas DC-6, DC-6B and the Lockheed Constellation. The Constellation has a stronger undercarriage than the DC-6B but it is a heavier unit—not as heavy, however, as might be imagined with the tall nosewheel structure. The DC-6B undercarriage is on the weak side by modern standards and on paper the DC-6 is even weaker, and could not be regarded as an all-purpose blind landing undercarriage.

However, in practice weaknesses do not show up and it raises the point whether the others are not unnecessarily strong. The amount of scatter in the strength figures, especially of those in the British aircraft, seems to show that this is a branch of aviation still governed too much by rule of thumb. It is also about time that the requirements for civil and military transports are reduced to a common standard.

An interesting quartet include the Vickers Viscount, the Convair Liner, the Armstrong Whitworth Apollo and the Airspeed Ambassador. Of these the Apollo's chassis is not only the lightest but by far the strongest and intended for landings under automatic control without a flare-out.

The Viscount's undercarriage is an edge lighter than that of the Convair Liner. The Ambassador's high gear weight shows the penalty for its high



Jet Transport Undercarriage—The duplicated main wheels of the Vickers Viscount twin-jet transport are divided and retract on either side of the jet pipe of the Rolls-Royce Tay jets rated at 6,200 lbs. static thrust each. The undercarriage has been engineered to take maximum advantage of the propeller-less powerplants. Special care has been taken in this model to avoid radiant heat from the engine affecting the tires.

wing. However, if the Ambassador gear is compared with the high-wing Northrop Raider and the Bristol 170 it shows up well, particularly as the other two have fixed unfaired undercarriages.

In the feederliner class the de Havilland Dove shows a slight weight advantage over the Percival Prince, which is not surprising in view of the latter's high wing. The Prince's undercarriage seems a shade too weak. The Dove has been used for British blind landing experimental work and the undercarriage has proved satisfactory.

Some Military Gears

The table of military gears is not complete. Enough is published, however, to show that the shorter chassis of the jets does not appreciably lower the overall relative weight. The advantage of having no propeller is offset by the greater strength to withstand high air loads and to the small size of the aircraft which militates against a light undercarriage.

Ground angle of the jets shows some big differences. A large ground angle is important for many reasons—such as the ability to hold the tail down and increase drag to reduce landing roll. The McDonnell XF-88 is, however, a good illustration of how it is possible to have a very large ground angle under the tail without upsetting the external line of the rear fuselage.

Undercarriage Data

U. S. & British Jet Aircraft

Model	Vertical velocity (ft./sec.)	u/c weight % of max. weight	Tail ground angle (°)
F-86 Sabre	13	..	16
F7U-1 Cutlass ..	16	..	8
F-92 Delta	12	..	17
F-90 .....	..	..	14
F9F-5 Panther ..	..	..	11
F-80 Shooting Star	12	6.34	12
F3D-1 Sky-night .....	..	..	11
F-88 Voodoo ....	..	..	16
F2H-4 Banshee ..	..	..	18
B-47 Stratojet ..	..	..	10
F-84 Thunderjet	13	..	12
Sea Hawk 1 ....	..	..	13
Attacker 1	16	4.6	10
SO Espadon (Fr.) .....	..	..	8
Vampire 3	12	4.2	12
Hornet 3	12	5.3	14
El/44	12	4.3	13
Meteor 4	11.5	6.1	13
Canberra B-2 ..	..	..	13
D-558-II .....	..	..	10
Bell X-1 .....	..	..	8

Design Trends

By Richard G. Worcester



PRODUCTION rather than research, and realism rather than idealism in design, are marks of the armed truce between Russia and the West. It would have shown a gross misunderstanding of the gravity of the world situation if the U. S. had chosen this moment to introduce a string of unorthodox projects likely to divert industry from the task of quantity building. The pattern of products being rolled out tell a story of adaption and improvisation in the interests of increasing deliveries. It may be, however, that the USAF has decided that thickness ratios of 6 aspect ratios of 3, stall angles of 35 and wing loadings above 100 add up to a fighter which is simply not required either now or in the immediate future.

Under the MDAP scheme the U. S. pays for aircraft made by European industry for the Europeans themselves to use in their armed forces. The agency which must determine that the billions will be used to sponsor worthwhile designs has a heavy responsibility. The list of Europe's best products is none too long but this could prove an advantage in the interests of standardization. In France promising types are the Dassault Ouragon and its Hispano Nene, Franch Vampires, the S. O. Corse II, the Nord 2500, the N.C. 1080, the big Greguet Deux Ponts and the S. O. jet bomber program with the 6,000-lb-thrust ATAR jet. Holland has the Fokker Meteor and the S.14 jet trainer. In Italy there is the Fiat G-80 and the Ghost or Nene jet, in Belgium there is the Derwent jet. In Switzerland, Scandinavia and Denmark the Nene and Ghost engines or Meteor and Vampire assemblies could be built. Britain is self-supporting on all types except jet bombers and the best of these is undoubtedly the Vickers 150,000-lb. medium bomber.

In a movie the other day an aviation sequence lasted less than 30 seconds yet somehow the studio in this short space of time contrived to make a major technical error. In full-length aviation movies the linking of mistakes and grotesque unreality is surely not essential for mass appeal. Somebody ought to tell the Pharaohs in Hollywood that they should not depict aviation in any shape or form—not even a single frame—without having it checked. Los Angeles is full of aviation technicians they could use any time.

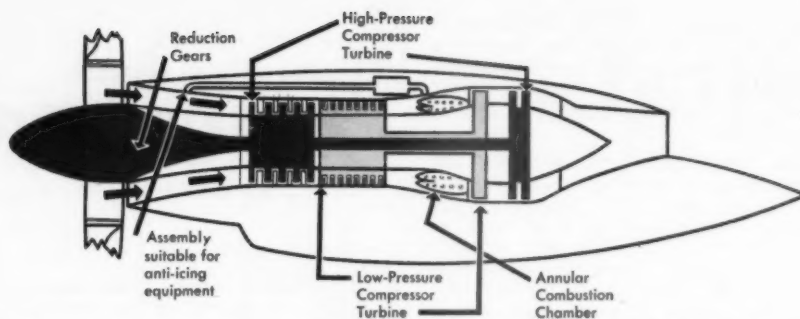
Many people feel impatient with engine designers who let out a roar of protest that their compressors are not cows to be milked for cabin pressurization or their jet effluxes for de-icing. Gordon Williams of Boeing is so right to appeal for a reverse in the trend towards complexity. Simplicity in this case means the engine and airframe maker getting together and designing into their unit the necessary ancillary services. Piston-engine manufacturers could work in a vacuum when whole powerplants could be bolted on to all sorts of different airframes but there is no real dividing line between turbine and airframe responsibilities.

When Convair and Douglas make out a case for a delta wing while North American and Lockheed show why in the F-93 and the F-90 they used a tail and swept trailing edge the arguments on each side seem overwhelming. When Beech explain the advantages of the Vee tail, Boeing the podded jet, Northrop the all-wing, and de Havilland the single-sided impeller they are unanswerable—until one hears the other side of the story. It seems possible that the importance of which course a company decides to adopt is generally exaggerated because the resulting differences in the final product are probably marginal anyway. But it must all seem difficult from the chief designer's chair where is concentrated the bewildering chaos of clear opinions.

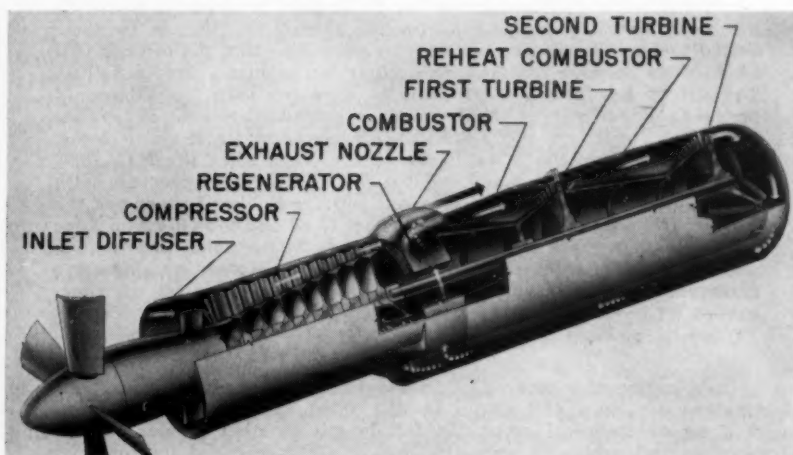
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Worcester, R. G.

Three Turboprop Designs

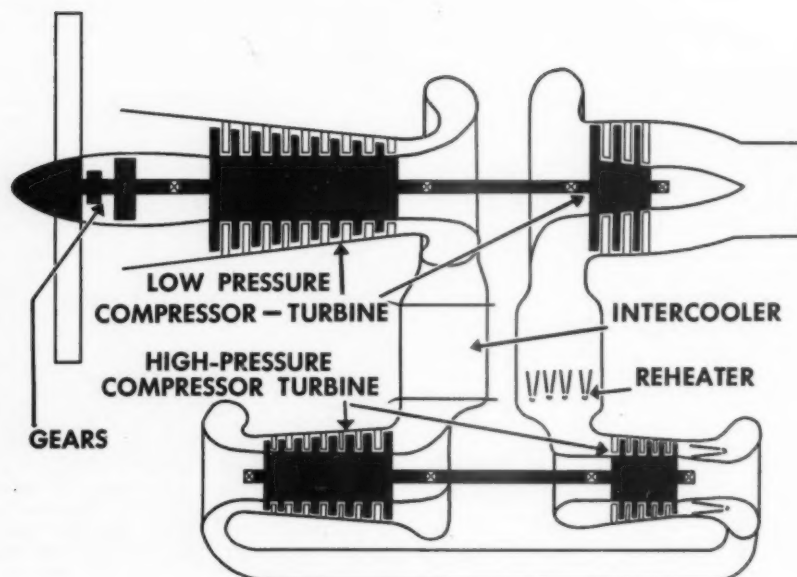


High Pressure-Ratio—The Pratt and Whitney T-34 (PT-2E) has a 13-stage compressor and a three-stage turbine with annular combustor. In the above diagram the propeller and low-pressure half of the compressor are driven by two stages of low-pressure turbine. The high-pressure compressor is driven (at different speeds) by a mechanically independent co-axial shaft from the first stage turbine. The Rolls-Royce Clyde is similar except that the high pressure turbine is a centrifugal unit. The advantage is in high pressure-ratios, the disadvantage is the difficulty of matching the halves of the engine.



High Speed—This NACA design of turbine shows the two stages of turbine split with a reheat combustor between for greater turbine output. There is greater engine power but the length of the engine could be awkward. To retain these features with greater fuel economy NACA has designed a re-generative layout using the same engine.

Fuel Economy—In this Westinghouse study the low-pressure compressor is driven by a low-pressure turbine. The intercooler is used to reduce the dimensions of the high-pressure turbine and compressor assembly. Reheat is required to help drive the low-pressure turbine. Advantage is a low fuel consumption but disadvantage is the weight, size and complicated ducting of the engine.



Petroleum Experts Look at Turbine Fuels

By WILLIAM D. PERREAULT

(Editor's Note: The following article is based on a group of papers presented during a symposium on commercial aircraft turbine-engine fuels and lubricants sponsored by Standard Oil Company of California. It was one of the outstanding discussions on this subject ever to be presented. Attendance was by invitation only. A limited number of copies of the papers presented were circulated to industry groups.)

DURING World War II, 14.5% of the total processed crude petroleum went into aviation gasoline. By the changing nature of aircraft powerplants, another emergency would see two-thirds of the fuel requirements going to turbine engines, one-third for piston engines. The higher power outputs of turbine engines and their acknowledged higher fuel consumption further emphasize the trend. The fuel specification for turbine engines must be adaptable to high-volume production requirements.

The principal fuels in use or under consideration for turbine engine use are:

Mil-F-5572—AN-F-48—80/87 Aviation fuel

Mil-F-5572—AN-F-48—100/130 Aviation fuel

Mil-F-5616—AN-F-32—JP-L Kerosene

Mil-F-5616—AN-F-34—JP-2 Kerosene and gasoline

Mil-F-5624—AN-F-58—JP-3 Diesel fuel, kerosene, gasoline

Pratt & Whitney—811—Modified kerosene stove oil

By the nature of its composition, JP-3 is well suited to military requirements, not because it has the best combustion characteristics, but because almost 50% of the barrel of crude can be made to meet the specification. The blended nature of JP-3 would appear to confirm that turbine engines can operate efficiently on a wide variety of fuels. This is only partly true.

Nozzle Selection

Careful selection of the fuel discharge nozzle and matching with the combustion chamber characteristics is required for efficient operation. No one nozzle will handle the present-day range of fuels. Minimum flow

values are established by the acceptable nozzle spray and this varies with temperature and viscosity of the fuels.

Fuel nozzles can be designed to handle JP-3 efficiently. This does not remedy the combustion characteristics of the fuel which, because of the variety of blending components, is difficult to predict. Excessive carbon formation, vapor and slugging losses are apt to accompany the JP-3. Regardless of these shortcomings, the producibility of the JP-3 specification make it the best choice for the military services. Modification of the basic specification and improved fuel handling systems may correct some of these shortcomings.

Meanwhile, the engine manufacturers, fuel suppliers and operators must look forward to establishing commercial turbine-fuel requirements. This is not too difficult, provided that no requirement exists for rapid transition from civil to military operations. The commercial volume is very small, less than 1% of total U. S. crude. For this reason commercial operators can be very selec-

tive in making their choice of turbine fuels, looking more toward combustion efficiency, cost and related factors.

Stove Oil

Kerosene is not as attractive as stove oil for commercial use. The rigid specification requirements of kerosene, governed by its use in household lamps and stoves, raises its cost without any tangible improvement in performance. Stove oil (see chart) has relatively the same performance characteristics but and is more widely distributed.

On the basis of heating value (specifically cost per Therm or 100,000 BTU's) stove oil costs only 64% as much as 100-octane gasoline. Kerosene, by comparison, costs 71% as much. Considering that 20% of the airlines flight operating expense is represented in fuel purchases, the 3-5c per gallon savings on turbine fuels is a major consideration.

The single most important characteristic of any jet fuel is its volatility, its relative tendency to evaporate. In considering turbine fuels such as the AN-F-48 series (aviation fuels) the importance of volatility is underscored. (see chart.) In climbing to 30,000 feet gasoline evaporation losses can represent 10% or more of the basic supply. With kerosene type fuels, of very low volatility, the vapor losses up to 55,000 feet are negligible.

Vapor Losses

Vapor losses might be overcome by pressurization of the fuel tanks. It was pointed out that an attempt to provide 5-psi tank pressure would result in a weight penalty of one-third pound per gallon in increased structural weight. Airborne refrigeration equipment might also minimize this problem but would cost one-tenth of a pound per gallon in weight and a 10% increase in drag for a typical fighter.

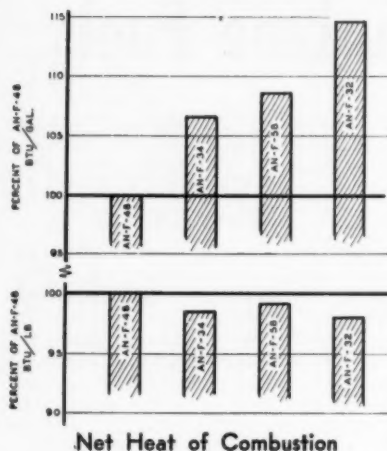
Cooling the fuel on the ground, possibly in the storage pit, has also been suggested but cooling to prevent a 1% loss during a 50,000-foot climb would require 20 tons of ice. A fuel with a Reid Vapor Pressure of 7 psi, such as gasoline, would require a pump two to four times as large as that required for kerosene.

Given the proper circumstances, kerosene will burn outside the combustion chamber. It is not a safety fuel. It is much less susceptible to



B-47 Cell—This giant-sized fuel cell, manufactured by The B. F. Goodrich Co., fills the fuselage cross-section of the Boeing B-47 at a point under the wing. The 2,500-gallon fuel cell is eight feet nine inches long; eight feet one inch wide and seven feet high. The smaller oil cell, being held by Teresa Giglio, is one of numerous other cells in the B-47 ranging in capacity from 300 to 900 gallons.

Facts About Turbine Engine Fuels



Civilian Domestic Petroleum Demand

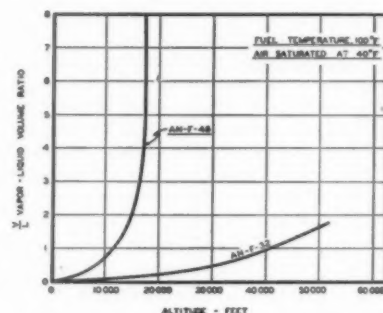
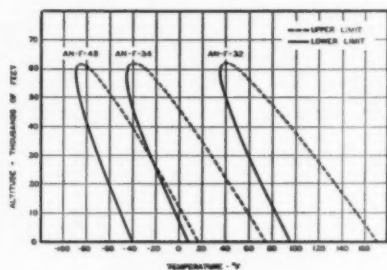
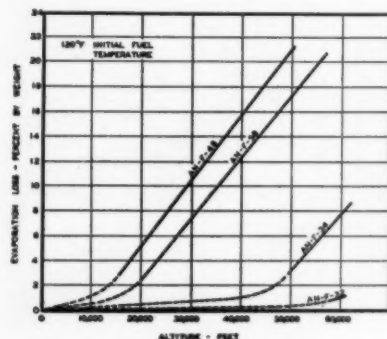
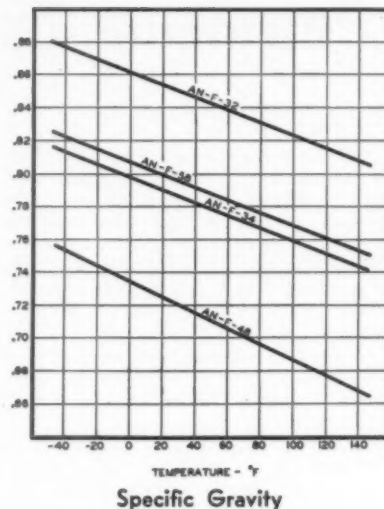
United States—1949*

	Gallons (000 Omitted)	%
Gasoline excluding aviation	36,327,564	49.1
Aviation gasoline	543,564	0.7
Kerosene**	4,154,724	5.6
Stove and Diesel oils ..	13,338,192	18.1
Fuel oils	19,590,732	26.5

Total 73,954,776 100.0

*Source—U. S. Bureau of Mines reports.

**Excludes Military JP-1 which was additional 125,842,000 gallons.



Physical Properties & Prices of Possible Turbine Engine Fuels

	100 Octane	Third Structure Motor Gasoline	Kerosene	JP-3	Stove Oil ¹	Furnace Oil ²	Light Fuel Oil ³	Heavy Fuel Oil ⁴
Cents/Gallon ⁵	16.00	12.65	12.65	12.00	11.62	10.62	7.15	5.75
Cents/Therm.	14.10	10.8	10.10	10.10	9.10	8.0	5.00	3.95
Lbs./Gallon	5.988	6.184	6.720	6.371	6.972	7.273	8.110	8.229
BTU/Gallon	113,900	116,900	125,800	119,800	129,400	132,900	143,100	144,900
BTU/Lb.	18,980	18,880	18,570	18,790	18,420	18,270	17,730	17,620
Reid Vapor Pressure-psi	6-7	8-12	0.2	5-7	0.1	Nil	Nil	Nil
Flash Point °F.	Below -80	Below -80	150	Below -80	150	170	190	190
ASTM Distillation								
10% Temp. °F.	140	135	375	170	400	460	460	—
90% Temp. °F.	260	325	480	425	520	610	—	—
Vis. C. P. @ 100 °F.	.38	.44	1.29	.61	1.40	3.28	129	556
60	.48	.57	1.93	.79	2.18	6.48	632	4,000
0	.80	.91	4.60	1.32	6.02	31.4	29,900	—
-40	1.22	1.35	11.0	2.1	18.0	—	—	—
Pour °F.	Below -76	Below -76	-40	Below -76	Below -50	-5	-10	-120
Ash, %	Nil	Nil	Nil	Nil	Nil	Nil	.05	.07
Cost, %								
% of 100 Oct./Therm.	100	77	71	71	64	57	36	28
% of 100 Oct./Gallon	100	79	79	75	73	66	45	36

¹Stove Oil, Comm. Std. Grade No. 1—PS-100 (Auto Diesel)
²Furnace Oil, Comm. Std. Grade No. 2—PS-200 (Diesel Fuel)
³Light Fuel Oil—Comm. Std. Grade No. 5—PS-300

⁴Heavy Fuel Oil—Comm. Std. Grade No. 6—PS-400 (Bunker C)
⁵Typical airline-airport delivered prices including shipping costs at average distance from refinery.

flash fires than gasoline because of its low volatility and high flash point (see chart). On the other hand, kerosene fuels can form explosive mixtures (see chart) in the fuel tank. This is characteristic of fuels with Reid Vapor Pressures from .5 to 5 pounds. At or above 5 pounds RVP mixtures in the tank are too rich to ignite.

Freezing Point

Kerosene is susceptible to freezing at temperatures of minus 40 to minus 50 degrees Fahrenheit. For commercial use minus 50 should be satisfactory. Since present-day military specification AN-F-32 requires at least minus 76 degrees freezing point it is unduly restrictive. Such restrictions cut down the supply of fuel and raise its cost.

A small amount of water can be dissolved in fuel. At normal atmospheric temperatures saturated kerosene contains about 1/2% water by weight. As the temperature is reduced to 10 degrees F. this water precipitates out forming ice crystals which clog the fuel filters. Wax in some fuels aggravate this condition.

As little as 1/2% of isopropyl alcohol added to the fuel will prevent the ice formation but in time the alcohol absorbs moisture itself. With sufficient agitation fuel can also carry excess water. With kerosene type fuels it will be particularly important to drain fuel sumps and keep excess water to an absolute minimum.

Heat of Combustion

No small factor in determining commercial turbine engine fuels will be the relative heat of combustion. Tests have shown that the heat value of fuels has a direct bearing on aircraft range. Gasoline averages 113-125,000 British Thermal Units per gallon, kerosene 123-129,000 BTU's, stove oil 126-135,000 BTU's and furnace oil distillates 132-140,000 BTU's. Since furnace oil distillates would probably require heat to permit low temperature handling, and the high aromatic content of some stocks might cause smoking and coking, stove oil would again appear to be out in front of its competitors.

Turbine engine and aircraft lubricants pose many special problems. Temperatures range from minus 50 degrees F. to plus 500 degrees. Rotating speeds range from 8,000 rpm to 100,000, there is high loading on gears and pumps and corrosion is possible because of unusual moisture condensation conditions. Common approaches to the problem are closed. The same unit required to take high rotational speeds and temperatures is sometimes required to function at low temperatures and low torque.

Reduced air cooling at altitude will run bearing temperatures high on the generator while the aileron bearings are at sub-zero temperatures.

TECHNICAL NEWS DIGEST

• **Dr. William Bollay**, director of North American Aviation's Aerophysics Laboratory, has been selected to deliver the Fourteenth Wright Brothers Lecture. Bollay will present his lecture on "Aerodynamic Stability and Automatic Control" at the U. S. Chamber of Commerce Building in Washington, D. C. on December 16.

• **TWA is installing AiResearch cabin pressurization equipment** in four Lockheed L-049 Constellations which are used in transcontinental coach service. Each plane seats 81 passengers. In addition to increasing general comfort the systems will increase air flow to levels suitable for the new requirements.

• **Airport at Lima, Peru, will be provided with the first instrument landing system** in South America as a result of an agreement reached between Panagra and CORPAC, an official agency of the Peruvian government. Panagra will lend the estimated \$180,000 to CORPAC for the ILS installation for general airline use.

• **CAB has amended CAR Part 41 to eliminate the past requirement** that a complete service history of propellers be available in order to use props on air-carrier aircraft. Ruling applies primarily to war-surplus Hamilton Standard propellers for the Douglas DC-3, DC-4, Lockheed 18 and Curtiss C-46 planes. New regulation provides that overhauled propellers meeting general manufacturers' tolerances will be usable without prior service records.

• **Raymond Le Compte**, chief engineer of air routes in Belgium, has arrived in the U. S. to study airway traffic control methods and equipment in the U. S. The Belgium Air Routes group closely parallels CAA's Federal Airways.

• **A new wind tunnel balance developed by The Glenn L. Martin Airplane Co.** measures three moments and three forces simultaneously and presents readings remotely on dials in the control room. Economical, simply constructed and easy to maintain, the Martin wind tunnel balance weighs three pounds.

• **Extruded architectural bronze is being used by Boeing Airplane Co.** in the B-47 Stratojet for elevator and rudder counter-weights. Bronze was substituted for steel to prevent the possibility of influencing the readings of the fluxgate compass transmitter which is located in this area.

• **The Texas Company has completed work on its new research facility at Beacon, N. Y.**, adding 55,000 square feet, almost 40%, to existing facilities at this laboratory. The building is part of Texaco's 10-year research expansion program to be carried on at its 28 research and quality control laboratories.

• **A "Parade of Progress" has been put on the road by Minneapolis-Honeywell Regulator Co.** for a 60-city, coast-to-coast tour which will last into the spring of 1952. Included in the "Parade" are some 38 new automatic controls including those M-H units for aeronautical use.

• **At Inyokern, Calif., the Naval Ordnance Test Station** has started design work on an 11-mile precision track for testing guided missiles, rocket launchers, large aircraft components, etc. Estimated cost is \$5,500,000. Nicknamed "SNORT," it is formally designated Supersonic Naval Ordnance Research Track.

• **CAB ruled out the claim of Florida Airways** that faulty Continental Motors Corp. engines contributed to the failure of the feeder airline. The Board concluded that the experienced rate of engine failures was not excessive or abnormally high in relation to experience with other new engines. CAB cited approval of applications for increased inspection and overhaul periods as proof that the engines operated satisfactorily.

• **The General Electric Co. has opened its new measurements laboratory at Lynn, Mass.** Its facilities will be devoted exclusively to development of new measuring devices, creation of new materials for these devices and the critical analysis and improvement of designs already on the production lines.

Thanks to Research that Never Says "GOOD B"



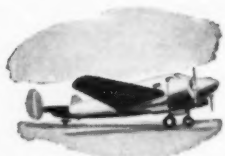
If you were to name the predominant characteristic of the Bendix Radio organization, you could hardly find one more fitting than *persistent research*. Engineering teams at Bendix Radio are forever probing, questioning, experimenting—sometimes it is the job of working "bugs" out of an accepted idea; often, they are exploring an entirely new concept. But, inevitably this constant searching produces better equipment for you. For instance, Bendix Radio pioneered and perfected the Automatic Radio Compass, VHF Transmitters and Receivers, Omni-Range Navigation Systems, and GCA, as well as many other revolutionary developments. Every piece of equipment, from airborne transmitters, receivers and radio compasses to ground Radar or GCA equipment shows the effects of this research—so well, that Bendix Radio *performance* and *dependability* have become world-famous. When you consider aircraft radio, look *first* to Bendix Radio, and be sure of the *last* word in quality and design.

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tems • Flightweight Personal Plane Radios • VHF Omni-Directional Range Systems

Extra Section

By William D. Perreault



APPARENTLY, as in the case of the hole in the doughnut, they've found out that vibration in the instrument panel is necessary. **Safe Flight Instrument Co.** is now working on a production run of instrument panel vibrators for the Boeing B-47 Stratojets. It appears that, following years of design refinements on shock mounts for instrument panels, the jet-powered plane virtually eliminates panel vibration. As a result, gear friction in the low-torque instruments such as the altimeter and air-speed indicator causes instrument lag which is intolerable. Based on the control stick shaker used as a stall-warning device in jet fighter aircraft, Safe Flight, White Plains, N. Y., has designed an 11-ounce unit that does the trick—it vibrates the panel. Meanwhile, communications gear and similar equipment will benefit from vibration-free operation.

When a suspected hold-up man chose Denver Municipal Airport to elude the police one night recently, he made the wrong choice. When the police spotted him in the terminal he rushed out into the dark on the field. Some gunplay followed and two alert tower operators went into action. Warren Loustalet and G. G. Pettibone used the tower signal guns to spotlight the man as he fled for cover. Their efforts were effective and the suspect was jailed.

Under the heading "Tints and Hips on How to Jeta Make Engine" **Rid Dowding** presents an interesting essay in the September issue of **Avro** (A. V. Roe of Canada) *News*. Portions of it follow: "Lots of thinkle peep that all you do is bess a prutton and out jets a pop engine! Nothing could be thruther from the futh. Blues of set prints are the parting stoint, and a well shopped out machine lay is an aluable vasset. 'Tool us the gives, and we will jinish the fob,' as the going says . . . And all the time backing in the hoverground, the hidden scene behind the hands, is the chig white bief, who peeps the keace with the multitude of con subcontractors, aching purchasents, miniset cabinsters, and, most important, he peeps the kay man coming . . . What a boisey munch those testers are! They mart up the stotors with an ear roaring split, keep it scrumbling and reaming all day and nome of the sight too but its our butt and breader, so we mustn't stink up too muck of a kick . . . So there it is, airing in fly, or doing run ground, met jotors are kear for heeps, and to motea good quotto "nothing but the good is best enough."

Standardization pays. Douglas Aircraft, according to the American Standards Association, adopted an industry-wide standard design for 217 internal wrench bolts used per plane. It saved \$268.74 per plane and, in the case of the C-54, reduced weight by eight pounds. In an interesting booklet titled "Standards and Your Business," the ASA, which is staging a National Standardization Conference at New York's Waldorf Astoria on November 27, 28, and 29, describes the work of the organization both with U. S. industries and in establishing international standards.

Ever wonder which of these fluids and gases around the airplane are considered toxic? In his interesting paper presented during the National Safety Council meeting in Chicago CAA's **C. R. Spealman** provided this list: Anti-detonant injection fluids; battery fumes; coolant fluids (liquid-cooled engines); de-icing or anti-icing fluids; exhaust gases; fire extinguishments; hydraulic fluids; insecticides; propellants (gasoline, JATO, etc.); refrigerant fluids (air conditioning, refrigeration), and smoke and thermal decomposition products other than exhaust gases.

Spealman noted that while there is little evidence that battery fumes are of much toxicological concern it has been reported that a monkey being transported in a baggage compartment presumably died of this cause.

AMONG THE SUPPLIERS

Robert J. Reidy has been named sales representative of the automotive, aviation and government division of **The B. F. Goodrich Co.** in the Milwaukee, Wis., district, succeeding **Albert B. Goering** who is retiring . . . **Elastic Stop Nut Corp.** of America, Union, N. J., has appointed **Kenneth D. Davis** district manager of the Chicago office . . . **A. V. Feigenbaum** has been appointed to the staff of **C. W. LaPierre**, manager of **General Electric's** aircraft gas turbine divisions, Lynn, Mass.



Davis

Solar Aircraft Co., San Diego, Calif., has appointed **John H. Baker** manager of the Washington office. He succeeds **Philip L. Ward** who has returned to the San Diego plant as assistant chief engineer of the newly formed Development Engineering Division.

Aircraft Engine & Parts Corp. of New York City has appointed **Joseph P. Connor, Jr.**, treasurer. Connor was formerly administrative officer in the Bureau of Internal Revenue.

Daily Plane Utilization Domestic

		July August	
American	2 eng. pass. . .	5:19	5:33
	4 eng. pass. . .	8:23	8:29
	cargo	3:57	5:25
Braniff	2 eng. pass. . .	5:30	5:39
	4 eng. pass. . .	7:43	7:45
Capital	2 eng. pass. . .	7:28	7:31
	4 eng. pass. . .	8:45	8:32
	cargo	3:29	6:32
Caribbean	2 eng. pass. . .	3:52	3:46
	2 eng. pass. . .	8:20	8:15
C & S	4 eng. pass. . .	9:29	9:32
	2 eng. pass. . .	5:47	6:52
Colonial	4 eng. pass. . .	6:55	7:00
	2 eng. pass. . .	6:58	6:37
Continental	2 eng. pass. . .	6:52	6:46
	4 eng. pass. . .	6:24	6:51
Delta	cargo	6:32	7:31
	2 eng. pass. . .	9:37	9:14
	4 eng. pass. . .	8:20	7:40
Eastern	cargo	3:07	"
	2 eng. pass. . .	4:48	5:26
Hawaiian	cargo	2:18	3:57
	2 eng. pass. . .	10:03	10:58
Inland	4 eng. pass. . .	6:39	6:44
	2 eng. pass. . .	5:53	5:58
MCA	2 eng. pass. . .	5:07	5:04
	4 eng. pass. . .	8:51	7:43
National	cargo	2:33	1:19
	2 eng. pass. . .	7:00	7:14
Northeast	4 eng. pass. . .	4:45	4:51
	2 eng. pass. . .	6:42	6:53
Northwest	4 eng. pass. . .	8:13	8:20
	cargo	4:46	4:48
Trans Pac.	2 eng. pass. . .	3:25	3:30
	2 eng. pass. . .	6:41	6:57
TWA	4 eng. pass. . .	8:04	8:08
	cargo	5:25	3:55
United	2 eng. pass. . .	5:18	5:46
	4 eng. pass. . .	7:59	7:46
Western	cargo	3:54	4:45
	2 eng. pass. . .	7:31	7:28
	4 eng. pass. . .	6:00	6:22

*C-54 cargo aircraft sub-leased to Pan American during August.

NEW PRODUCTS

500-Amp Generator

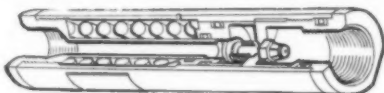
Jack & Heintz Precision Industries, Cleveland 1, Ohio, is producing a new generator, primarily for ground power use, rated at 500 amperes, 30 volts DC. Weight is less than 80 pounds, over-all length from mounting flange 13 inches.



Uses standard 11-inch diameter, 10-inch bolt circle mounting flange to fit AND-20006 pad. Generator proper is about 9-27/32 inches in diameter. Equipped with a flexible coupling and protected against dangerous stresses by a friction damper. Capable of intermittent overloads up to 1,000 amperes for limited periods, as in starting jet engines. Current model is air-blast cooled.

Relief Valve

Vinson Manufacturing Co., 8044 Woodley Ave., Van Nuys, Calif., is offering a balanced outlet relief valve for pressures up to 3,000 psi. Available in 1/4", 3/8", 1/2" and 3/4" tube sizes. In the 1/2" tube size there is only 4.5 psi



pressure drop at eight gpm after opening. If set to crack open at 1500 psi it will fully open at 1,504.5 psi. Available in wide range of settings for reverse flow check, free flow in reverse and twin relief; relieving in both directions.

Mobile Air Conditioner

Airtemp Division of Chrysler Corp., Dayton, Ohio, has introduced a new mobile aircraft air conditioner for commercial airline use. It delivers 2,500 cubic feet of conditioned air per minute with provisions for higher outputs. The Airtemp unit cools air to approximately 50° F. Then it is filtered, dehumidified and discharged into the plane. Housed in a 12-foot production-built body, the unit consists of a seven-cylinder, 40-ton radial compressor directly connected to a 150-horsepower internal combustion engine, large cooling coils and an evaporative condenser. Water storage tanks are located underneath the truck. Provisions are made for use of a 200,000-BTU heater for year-around air conditioning. Main-

tenance accessibility provided by lock-back doors on the sides and back of body.

Snow Melting Chemical

Chem Industrial Co., 1114 Hippodrome Bldg., Cleveland 14, Ohio, is marketing an improved type MELT, ice and snow-melting chemical. Manufacturer claims the new MELT, produced in small pellets rather than powder form, is 99% active and that one pound has a thawing capacity equivalent to 30 pounds of salt or ten times that of flake calcium chloride. Chemical is sprinkled over ice or snow surfaces, will melt existing and subsequent snow and leave no residue. Available in 25-pound metal pails and 100-pound fiber drums. Also sold in ton lots packed in 100-pound moisture-proof paper bags.

Fluorescent Bulb

Stocker & Yale, Marblehead, Mass., is marketing a new lighting fixture which screws into the ordinary bulb socket providing twin-bulb fluorescent lighting without rewiring or other adjustments. The "bulb" contains two 4-watt lamps and all control components within the 2 x 6-inch shade. Hardly larger than the ordinary incandescent lamp, it pro-



duces over 400% more light for equal wattage. Provides up to 500 footcandles at three to five inches working distance. Lamps rated at 7,500 hours average life. Weight is 14 ounces. Supplied for 115-volt, 60-cycle operation, ratings of 220 volts, 50 or 60 cycles AC and 110 volts DC may be supplied. Price: \$9.75 each for five or less or \$8.67 each for six or more.

Noise Suppressors

Cornell-Dubilier Electric Corp., South Plainfield, N. J., has announced a new series of radio noise suppressor capacitors, known as the Type IN Series, designed for automotive equipment. Capacitor elements are rigidly clamped in position to withstand shock and vibration. Flexible wire leads are weather-proof with high-temperature plastic insulation. To assure low power factor, each capacitor element is non-inductive, vacuum wax-impregnated. Housed in hermetically sealed case. Available in three regular mountings and at 0.25 and 0.5 mfd, 150 volts dc. Other ratings and styles available on special order.

3,000-PSI Compressor

Cornelius Company, Minneapolis 1, Minn., has announced a new high-capacity pneumatic compressor. It delivers two cubic feet of free air at 3,000 psi delivery pressure, weighs only 15 pounds. Available with AC, DC and



hydraulic motor drives for various aircraft applications including operation of bomb-bay doors, gun chargers, and parallel applications.

Impakdriver

H. K. Porter, Inc., Somerville, Mass., has announced the Impakdriver, a simple tool for tightening or loosening screws, bolts or nuts. The Impakdriver converts the impact from a hammer blow into high torque value for the job to be accomplished. It is sold by itself or in sets with different combinations of bits and sockets for various sizes and types of screws, bolts and nuts. Particularly useful for starting stubborn nuts, bolts or screws.

Oil Dispenser

Sprague Engineering & Sales, 1144 West 135th St., Gardena, Calif., is in production on a new air-operated oil dispensing unit which delivers filtered oil to an airplane reservoir. The Model 277 is portable. An air tank is provided, which, when charged with 80 psi pressure, will dispense 36 quarts of oil. A Sprague air-operated pump



transfers the oil, thus completely eliminating electric cords, motors or starters. Dispensed oil passes through two micron filter elements in series. Designed to permit pumping oil from a barrel or storage tank by its own power system.

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Freight Lines Boost Military Volume at Published Rates

By KEITH SAUNDERS

IN THE THREE months immediately after the start of the Korean conflict, U. S. air carriers hauled more than 3,000,000 ton-miles of military materials and supplies to West Coast ports of embarkation and Air Force staging bases.

This was only about 12% of the volume flown domestically by the certificated commercial airlines during the period, but it was an amount of domestic air lift urgently needed and without which the cargo phase of the Pacific air lift undoubtedly would have been slowed down if not bogged down.

Both passenger and all-cargo airlines participated prominently in this commercial lift, supplementing the then inadequate cargo capacity of the Military Air Transport Service. While the passenger or combination lines took the initial lead in traffic volume handled for the military, the all-cargo carriers later forged to the front with common carrier rates lower than the charter rates the passenger lines had to charge when loads exceeded the capacity available in their passenger planes.

AF Handled Routing

The Army, which figured largely in the picture, turned over to Air Force transportation officers in Washington the job of securing the most expeditious routing for its personnel and cargo movements, and the Air Force, at first, gave most of the business to the certificated combination carriers, who were represented at the Pentagon by the Air Transport Association's Military Bureau.

Result of this arrangement was that airlines such as American, United and Capital got over 80% of the military cargo contracted for by the Air Force with commercial carriers in July, first month of the Korean war. The remaining 18%, or 175,000 of the 950,000 pounds so moved during the month, went via the certificated all-cargo lines, Slick Airways, The Flying Tiger Line and U. S. Airlines. Of the \$300,000 which the Army spent for this lift, over \$250,000 went to the combination carriers, about 98% being on a charter basis.

Then in late July the Air Freight Association arranged to have its own representation in the Air Force trans-

portation office in the Pentagon and set about convincing the military that cargo could be moved much more cheaply in most instances at common carrier rates rather than charter rates.

AFA's Bureau

The AFA bureau was conceived and planned by W. E. Hollan, vice president and assistant general manager of Slick; Ralph Starkey, executive vice president and general manager of U. S., and George S. Dart, eastern sales manager for the Flying Tigers. It was decided to have a representative of the group on hand at the Pentagon every working day. Dave Thomas of Slick, Fran Hasebauer of U. S. and Dolan Perry of the Tigers were assigned to the Pentagon duty. The man on duty would have the first crack at a contract for his own company but would assist in getting business for the other cargo lines if his own couldn't handle it.

The AFA representatives pointed out to the military that it should not contract for cargo to be flown at a charter rate when common carrier service was available. As an example, they cited a case in which a combination airline had been paid \$2,790 for flying 4,200 pounds of cargo on charter from a point in Texas to San Francisco, and a few days later Slick Airways flew 4,988 pounds of cargo between the same two points for \$900, which included trucking charges from the point of origin to San Antonio, which is on Slick's certificated trans-continental route.

It was explained that charters must necessarily be higher than common carriage since they usually involve paying for unused space (as when a DC-4 has to be used for 11,000 pounds of cargo) and for much "dead" mileage when no backhaul traffic is available.

Cheaper by Consolidation

The all-cargo representatives also showed how their lines could use trucks or short charter flights to get cargo to an on-line point and fly it at the common carriage rate. They consolidated several shipments from a given area into one larger shipment on which they could quote the low rate that applies to shipments of over 10,000 pounds. And they showed that they could usually fly cargo from the eastern seaboard or the midwest to the west coast on a single plane, whereas combinations of two or three passenger lines often would be involved in handling the same cargo.

In common carriage, the all-cargo lines could consolidate shipments and quote volume rates, and on charters they could offer C-46's at 70c a mile as against a C-54 rate of \$1.50 and a C-47 rate of \$1.

Result of this effort was that instead of one-sixth of the Army's commercial shipments going by common carriage, as in July, over 50% of it moved by common carriage in August. Furthermore, whereas the military had paid \$300,000 for the transportation of 900,000 pounds of cargo in July, it had to pay less than \$150,000 to move 700,000 pounds in August. The AFA member lines carried more than half the month's total, or about 430,000 pounds, for which they received approximately \$85,000.

September Results

In September, total volume of the Army shipments was 481,200 pounds

Army Air Cargo Hauled by Commercial Airlines for Korean Lift

(Within Continental U. S. Only)

	July	August	September
Total ton-miles	949,213	680,390	481,200
Charter ton-miles	765,666	325,097	116,033
Common carriage t-m	143,547	358,293	365,167
Ton-mile on passenger lines	775,000	250,390	184,600*
Ton-miles on all-cargo lines	175,000	430,000	296,600*
Charter cost	\$280,512	\$81,708	\$26,499
Common carrier cost	24,994	58,680	58,486
Av. t-m cost (charter)	.366c	.303c	.288c
Av. t-m cost (common)	.172c	.191c	.160c

*Estimated

Note: Data from Air Force Transportation Office.

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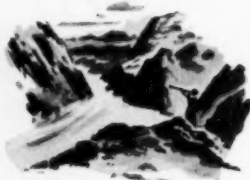
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TRAFFIC & SALES

and the cost \$84,985. This included 116,033 pounds moved by charter at a total cost of \$26,499 and an average ton-mile cost of .228c and 365,167 pounds moved by common carriage at a total cost of \$58,486 and an average ton-mile cost of .16c.

Substantial volumes of cargo also were moved during those months for the Air Force and the Navy.

A major factor in the business developed by the Air Freight Association for its members was the matter of equipment availability. After the Korean outbreak, a number of the cargo planes of the passenger airlines were shifted to the Pacific air lift, with the result that these airlines had to move larger-than-usual volumes of cargo in combination planes. The shapes and sizes of some military shipments, taken together with the limited space available in the cargo compartments of the passenger planes, made it difficult for the combination lines to handle much of the available military traffic.

The all-freight lines, on the other hand, lost little equipment to the lift, since their planes were mostly twin-engined C-46's not suited for long overwater operations. Seven of the Tigers' 12 C-54's went into the Lift, but untouched were their 10 C-46's, Slick's 21 C-46's and U. S. Airlines' six C-46's. This meant that the all-freight lines could bid on a lot of military cargo contracts that the combination lines couldn't touch.

CAB CALENDAR

Nov. 27—(Docket 3854) Hearing in Modern Air Transport Exemption Case. Tentative. Examiner William J. Madden. Postponed from November 20.

Nov. 27—(Docket 3800) Hearing on application of Los Angeles Airways for certificate amendment and renewal. 10 a. m., Conference Room "C," Departmental Auditorium, Washington, D. C. Examiner Ferdinand D. Moran.

Nov. 27—(Docket 4161) Hearing resumed in Trans-American Airways Enforcement Proceeding. 10 a. m., Room 810, Federal Building, Temple and Main Streets, Los Angeles, California. Examiner Barron Fredricks.

Nov. 27—(Dockets 3718 & 3867) Reopened hearing in Southwest Airways Renewal-United Air Lines Suspension Case. 10 a. m., Room E-214, Temp. Bldg. 5, Washington, D. C. Examiner Paul N. Pfeiffer.

Nov. 28—(Docket 3350) Oral argument before the Board in IATA Agency Resolutions Proceedings. 10 a. m., Room 5042, Commerce Building, Washington, D. C.

Nov. 29—(Docket 3966) Hearing resumed in West Coast Airlines Certificate Renewal Case. 10 a. m., E-214, Temp. Bldg. 5, Washington. Examiner J. Earl Cox.

Dec. 4—(Docket 2019 et al.) Hearing in Reopened Additional California-Nevada Service Case. 10 a. m., Room E-214, Temp. Bldg. 5, Washington, D. C. Examiner F. Merritt Ruhlen.

Dec. 5—(Docket 2888 et al.) Hearing in Latin American Air Freight Case (Skytrain Airways, et al.). Examiner Paul N. Pfeiffer.

Dec. 5—(Docket 3720) Oral argument before the Board in Trans-Texas Airways Certificate Renewal Case. 10 a. m., Room 5042, Commerce Building, Washington, D. C.

AMERICAN AVIATION

Over the Counter

Sales Promotion

A REAL sensational sales-promoter, an electric "spectacular"—claimed to be the largest neon sign in the world—was turned on by Eastern Air Lines on Nov. 17. The sign, 90 ft. high by 200 ft. long, is located on the Jersey side of the Hudson River opposite 125th St. in New York. EAL states that it will involve expenditure of \$2,500,000 over a 10-year period, and estimates indicate that 30,000,000 people will pass the sign per month and that 1,500,000 people live within readable distance.



Top left of the sign (see picture) is the EAL symbol, featuring the duckhawk, 40 ft. in diameter. On a line with the symbol are the words "Fly Eastern" in letters 160 ft. long and 25 ft. high. Lower portion says "Miami-Miami Beach" in 18-ft. letters, 200 ft. long. Middle section is a motograph, 20 ft. high and 200 ft. long, which carries 600 letters or approximately 120 words every minute. This motograph will give current temperature of Greater Miami once a minute and will carry other pertinent data about Miami and Miami Beach. The sign will be on for nine hours daily.

A few other facts: The sign can be read for about eight miles on a clear night, and for about three miles during daylight hours. It has 2,000,000 ft. of wire and over 2½ miles of neon tubing. The motograph has 15,000 bulbs, all of which must be changed every three months.

Ticket Offices

TWA has opened a Scandinavian sales office at 7 Jernbanegade, Copenhagen, Denmark, with Erik Ostbirk as district sales manager for the area.

National Airlines has opened a Paris office at 26 Rue de la Pepiniere, and has created a new European sales territory. European sales manager is William J. Peabody, who was American Overseas Airlines' Paris district sales manager for the past four years. . . . Northwest Airlines has moved its Los Angeles sales and ticket office from Pacific Mutual Bldg. to Hollywood-Roosevelt Hotel . . . Scandinavian Airlines System is moving its Los Angeles office from 108 6th St. to 510 W. 6th St.

Traffic and Services

CENTRAL Airlines started DC-3 service over half of its routes on Nov. 15. The 24-passenger planes replace single-engined Beech Bonanzas . . . When Compania Mexicana de Aviacion, Pan American World Airways' Mexican affiliate, receives DC-6's now on order, its tentative plans call for a 5-hr. 10-min. non-stop Los Angeles-Mexico City schedule. Present DC-4 schedule is 9 hrs. 10 min. The service may start in December. The CMA planes are first DC-6's to be equipped with Pratt & Whitney R-2800-CB-16 engines which produce 100 more high blower cruise horsepower.

British Overseas Airways Corp. has extended the reservations system heretofore in use on New York-London to cover all stations on London-West Indies-South American west coast route. Reservations will be controlled at various locations on the route so that advice on space availability can be given quickly to all stations concerned . . . TWA, in cooperation with Travel & Transport Inc., Omaha travel agency, is again offering all-expense tours to British Isles and Europe for U. S. farmers.

Western Air Lines' Los Angeles-Seattle coach flights are already sold out for Christmas, and New Year's Las Vegas holiday coaches have been sold out for some time . . . TWA is now operating 2,163 seats in each direction weekly between Los Angeles and Phoenix with its forthcoming Quickie Vacation promotion . . . Northwest Airlines has increased flights between the U. S. and Seoul, Korea, to two weekly . . . KLM Royal Dutch Airlines will inaugurate a series of special all-expense ski trips to Austria, France, Germany, Italy and Scandinavia, starting Feb. 10 and continuing until late spring.

Pioneer Air Lines, in compliance with CAB order, has discontinued service over the route from Amarillo to El Paso via Clovis and Roswell. CAB said the route should be abandoned because of lack of public utility.

ERIC BRAMLEY

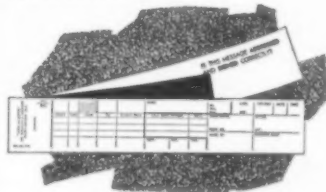
We SALUTE the new



Capital
AIRLINES
Constellations

THE LAST WORD IN LUXURY ALOFT!

To assure you of fast, accurate, efficient reservations service, Capital Airlines has selected a multiple copy form specially designed by McGregor and Werner Inc. to record your reservations.



SERVING THE AIRLINES
AND
THE AVIATION INDUSTRY

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- Tags—Single and multiple copy for baggage, parts, shipping.
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1640 Connecticut Avenue
Washington 9, D. C.

Efficient UAL Counter Unit Speeds Passenger Check-Ins

By FRED S. HUNTER

A new, functional-type counter unit, designed to save space and increase personnel efficiency, has been developed by United Air Lines and initial installation of a pilot unit at Los Angeles International Airport indicates it will greatly speed up passenger check-ins.

Essentially, the new counter section is the adaptation of one unit for two agents, with all behind-the-counter facilities within arm's length. Dual facilities are employed except for those which lend themselves to joint use and these are located along the center line of the double unit, thus being equally handy to each agent.

Several innovations mark the unit. One is an adaptation of the "sell and record" reservations system which has done so much to improve airline-passenger relations. A space availability board is incorporated midway and atop the counter. This board carries space charts for on-line flights for a period of two weeks.

For these flights, a flip of the board

is all that is necessary for instant confirmation of space, which is recorded with reservations later after the passenger has been ticketed and sent merrily on his way. Only on reservations farther in advance or where interline connections are involved is it necessary for the agent at the airport to make telephone contact with reservations while the passenger remains at the counter.

Another feature is the location of a Viewmaster scale at each end in such fashion that the baggage going across it is at arm's length of the agent. This will save agents from working up a crick in the back on a tough day, and also promises to net extra dollars for the airline. United, at Los Angeles, collects about \$8,000 a month in excess baggage charges. It is estimated the new unit should increase this to about \$15,000 a month by exposing countless brief cases and similar cabin-type luggage which the check-in agents have been missing.

A bread board—just like the one in your kitchen—is another one of the unit's handy devices. Pulled out,

it carries schedules and a fare table which may be observed at a glance.

Bag Tags Racked

Baggage tags, which are so easy to mix up, are pigeon-holed atop the counter at angles which make the tags themselves plainly visible to the agent so that even with the most severe case of astigmatism it is practically impossible to pick up the wrong tag.

Cash drawers, ticket stock drawers, storage compartments, all are designed to simplify the work of the agent behind the counter, reduce errors to a minimum, speed up all passenger handling and "break" the check-in lines which pile up at trip times.

First installation was made at the Los Angeles airport where United has just spent approximately \$35,000 doubling lobby space and otherwise expanding its facilities to alleviate critical passenger congestion. Plans are to incorporate similar sections at other terminals on the system where volume of passenger traffic is heavy.

Zoning Cuts Air Parcel Post Rates to Alaska

Establishment of parcel post zones between the U. S. and Alaska on November 15 has resulted in reduced rates for air parcel post between points in western U. S. and 230 post offices in Alaska.

Replacing of the previous system which based all rates from U. S. to Alaska on the 8th zone rate to that of basing rates on distances between points of mailing and points of address, saves \$1.06 on a five pound parcel sent air parcel post between Seattle and Juneau, Ketchikan, Sitka, Skagway or Wrangell. Although Pacific Northwest states derive most of the benefits, savings are also made on shipments from as far east as North and South Dakota and at points in New Mexico and Arizona destined for certain Alaskan offices.

CAB Planning Staff Named

Civil Aeronautics Board has established a special planning staff to develop new policies of operations and to re-examine certain established policies, as a forerunner to Chairman D. W. Rentzel's plan to streamline CAB procedures.

On the staff are Robert J. G. McClurkin, director of economic bureau; Frank Crozier, special advisor; Warner Hord, chief of accounting and rates division, and G. B. Slebos, chief of analyses division.



Functional Counter—Dick Austin, chief passenger agent for United Air Lines at Los Angeles, shows how baggage tags are at arm's length in new dual counter unit designed to simplify work of agents, and save on high-rent terminal space. The high-efficiency counter, particularly, is speeding up check-ins on heavy trips.

ADMINISTRATIVE

Kenneth M. Robinson, formerly assistant to the vice president handling legal, traffic and financial matters for American Airlines, has resigned to join the legal staff of the Henry J. Kaiser Corp. in Oakland. He had served as IATA representative for both American and American Overseas Airlines.

Allen Gebhardt has been appointed director of employe relations for American Airlines, replacing **F. L. Feind**, who resigned to go into the mercantile field. Gebhardt joined AA in 1940 and recently has been manager of industrial deferment.

OPERATIONS-MAINTENANCE

Larry Hoelscher, formerly with Parks Air Lines, is now station manager for Ozark Airlines at Keokuk, Iowa.

Clark S. Judd has been assigned as chief station agent for American Airlines at San Antonio, replacing **J. H. Shelton**, resigned. Judd is a 10-year employe.

E. J. Rogers, formerly manager of operations for American Overseas Airlines at Shannon, Ireland, is now manager of operations at Charleston, W. Va. He replaces **J. W. Eaken**, who went to St. Louis as manager of P&C service. **E. F. Gerber**, who had been chief ramp agent at St. Louis, was transferred to Chicago in the same capacity, replacing **J. W. Rulien**.

James Richardson, formerly chief agent for Frontier Air Lines at Salt Lake City, has been named station manager at Gallup, N. M., replacing **D. B. Clarke**, resigned.

Dick Nichols has been transferred to Utica-Rome as station manager for Robinson Airlines. **John O'Donnell** took over Nichols' former job at Syracuse, and **George Bright**, formerly at Utica-Rome, replaced O'Donnell at Binghamton.

Dorothy Gilmore, stewardess with Trans-Canada Air Lines since 1943, resigned this month to marry a Canadian engineer.

Capt. Merle Balch has been named assistant chief pilot for Pan American World Airways' Pacific-Alaska Division, with headquarters in San Francisco.

TRAFFIC & SALES

Frank N. Buttomer, formerly director of economic controls for Mid-Continent Airlines, has been named general traffic and sales manager for Wisconsin Central Airlines, effective December 1.

John B. Hanton, Jr., formerly director of passenger sales for Boeing Airplane Co. and before that with United Air Lines in Portland, has been named to

Airline Commentary

By Eric Bramley



WE WERE among those present on the recent pre-inaugural flight of British Overseas Airways Corporation's non-stop New York-Nassau Stratocruiser service. Here is a service that should turn out to be a sweet deal for vacationers from the northeast. It's only a four and one-half hour flight.

We came away with the impression (as we have on past British trips) that you have to get up early in the morning, or even the night before, to surpass the British in passenger service. They've got it, brother. Handling of the pre-inaugural flight was excellent (bouquets to **Jerry Wynne**, North American public relations officer, and **Eric Wheatley**, of the New York office). The party stayed only one day in Nassau and BOAC let people do pretty much as they pleased, which was a great improvement over some trips we've been on where you were expected to be here at 7:45 a.m., there at 8:42, somewhere else at 10:58, and so on through the day.

Aboard the flight was **Sir Miles Thomas**, BOAC's personable chairman, who, having once been in the newspaper business, realizes the value of good public relations and does the airline a lot of good in that respect. Also present were **Ronald McCrindle**, member of the BOAC board; **Keith Granville**, general manager of sales and traffic for the BOAC system; **Ross Stainton**, North American manager and **Cy Condon**, BOAC attorney in New York. One of the big kicks we got out of the trip was finally flying on an aircraft under the command of **O. P. Jones**, BOAC's bearded skipper who has flown over three million miles and about whom the stories are endless. We talked with him several times, and watched him function on the flight deck, and he's quite a fellow.

Seems that Charles E. Beard, executive vice president of Braniff International Airways, has been forced to inform people that reports of his death are greatly exaggerated. Some time ago, when Charles A. Beard, noted historian, died, the newspapers in some cities along Braniff's South American routes ran pictures of Braniff's Chuck Beard with the obituary. We are happy to report that these are two different Charles Beards.

A person with the ability to remember names is envied by many, including us. This ability is particularly valuable in the airline business. It's probably most valuable among stewardesses. And we've discovered a stewardess who really has it. She's **Betty Jo Clay**, an Austin, Texas, gal, who wins friends and influences people for Delta Air Lines. For some time after she was entitled to fly on DC-4s, she puzzled Delta's chief stewardess by preferring to remain on DC-3's. Finally she wrote that she "could do it now" and requested DC-4 assignment. The chief stewardess asked for an explanation, and this was it: Betty Jo had trained herself to remember 21 names on a DC-3. Now she had increased her capacity to 48 names and was ready for the DC-4. Based in Miami, she's now on DC-6's, remembering 56 names. It's a hobby with her, and Delta has received many complimentary letters from delighted customers. It's that personal touch that has won Delta many friends. How many of you could remember 56 names?

Steve Stimpson, of the United Air Lines in Los Angeles, has always been a great believer in service. That's how he happened to be the first one to think of putting stewardesses on airplanes back in 1930. So it was natural the other day for Steve, as a gesture of helpfulness, to gather up the hats of Jerry Pettis, assistant to the president; Jack Long, UAL's Los Angeles district sales manager; Dick Dobie, ground service manager, and several other UAL officials who were on hand to see off a Honolulu trip, and deposit them in a corner of the Aloha lounge where they would be out of the way. But he was a little too helpful. A passenger agent thought the hats belonged to passenger booked on the trip. He put 'em on the airplane. The hats went off to Honolulu.



BETTMANN ARCHIVE



Taking the measure of atmospheric pressure dates back to Torricelli's mercury column in 1643.

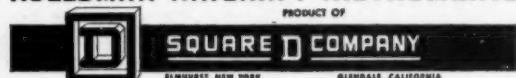
Subsequently, the aneroid—or fluidless—barometer was developed. But while it offered a much higher degree of portability, there was also a corresponding sacrifice of accuracy.

In fact, not until the advent of the first sensitive altimeter—engineered by Kollsman—was the aneroid diaphragm recognized to be an extremely reliable gauge of pressure differential.

The pointer of the Kollsman 80,000-foot Sensitive Altimeter accurately indicates a change of fifty feet while the positive diaphragm movement is only one ten-thousandth of an inch.

This outstanding example of precision engineering and careful manufacturing technique typifies Kollsman leadership in the fields of aircraft instrumentation, optics and electro-mechanical controls.

KOLLSMAN AIRCRAFT INSTRUMENTS



the newly created post of New York city sales manager for Northwest Airlines.

James Farrell, who for the past several years has represented Northwest Airlines in sales posts in Shanghai and Tokyo, has been named Orient sales manager, succeeding **R. J. Morgan**, now European sales director. Farrell spent 13 years with Eastern Air Lines before joining



Farrell

ing NWA in 1947 as district sales manager in New York.

Frank H. Bouche, owner of Sentinel Aviation Corp., has been named Washington representative for SABENA Belgian Air Lines, concerned primarily with regulatory and procurement matters.

Charles L. Bulterman, formerly traffic representative for KLM Royal Dutch Airlines in the New York area, has been transferred to Detroit as regional traffic representative.

Mrs. Hugh Jacox has taken over the duties of district sales manager for Capital Airlines at Charleston, West Virginia, replacing her husband, who has reported for active duty as a Marine lieutenant. Once before, when her husband entered the Marine Corps in 1943, she stepped into his job as sales representative at Pittsburgh.

Jere V. Chain, formerly of All American Airways, and **Leslie A. Neil**, formerly with the United Air Lines, have joined the sales staff of Transocean Air Lines and will handle special sales projects soon to be announced.

Charles H. Harriss, formerly sales manager for American Overseas Airlines in Stockholm, is now district manager of passenger sales for American Airlines in Chicago, where he was a sales representative before going overseas.

T. S. Zawasky, who was district sales manager for Northwest Airlines in Milwaukee, has been transferred to the same position in Rochester, Minnesota, replacing **Warren Miller**, who resigned to enter private business. **Morley F. Emerson**, assistant district sales manager in Chicago, was promoted to fill Zawasky's position in Milwaukee, and **J. Quinn Collins**, of the Chicago sales staff, was advanced to assistant district sales manager there.

Albert J. Pereira has been appointed district sales manager for the Miami and Havana sales areas of Trans World Airlines, replacing **D. A. O'Connor**, resigned.

Erik Ostbirk has been appointed Scandinavian district sales manager for Trans World Airlines, with an office in Copenhagen.

AMERICAN AVIATION

U. S. Domestic Airline Traffic for September, 1950

AIRLINES	REVENUE PASSENGERS	REVENUE PASSENGER MILES	AVAILABLE SEAT MILES	PASSENGER LOAD FACTOR	MAIL TON-MAILES ***	EXPRESS TON-MAILES	FREIGHT TON-MAILES	TOTAL TON-MAILES TRAFFIC	AVAILABLE TON-MAILES FLOWN	% AVAILABLE TON-MAILES USED	REVENUE PLANE-MAILES	SCHEDULED MILES	% SCHEDULED MILES COMPLETED
American	331,632	166,179,000	217,199,000	76.51	811,130	679,308	3,426,424	20,860,740	28,424,944	73.39	5,053,737	4,931,609	99.66
Bruff	54,124	18,867,000	31,406,000	60.07	98,083	88,685	202,498	2,196,686	4,062,637	54.07	904,799	917,759	95.68
Capital	135,338	41,845,000	71,990,000	58.13	127,669	193,860	723,298	5,050,348	9,845,761	51.29	1,919,209	1,841,479	98.42
Caribbean	5,297	434,000	1,171,000	38.51	525	2,109	37,512	114,414	114,414	32.78	44,329	44,256	99.13
C & B	31,416	10,470,000	17,700,000	59.15	51,737	76,105	79,705	1,211,446	2,041,473	59.34	605,971	604,035	99.76
Colonial	20,127	5,243,000	9,943,000	52.73	7,805	8,408	10,421	541,775	1,165,076	46.50	337,005	338,227	98.36
Continental	18,930	6,753,000	14,238,000	47.43	16,821	9,650	43,030	716,832	1,479,804	48.44	500,890	487,985	99.88
Delta	54,885	23,386,000	41,517,000	56.33	99,782	97,304	291,313	2,734,752	5,408,712	50.62	1,203,978	1,139,764	99.67
Eastern	225,989	95,475,000	158,791,000	60.13	376,952	371,100	575,715	10,982,566	20,680,799	53.10	4,013,633	3,971,264	98.22
Hawaiian	26,461	3,443,000	5,431,000	63.40	4,142	8,985	51,883	350,162	624,140	56.10	250,152	207,172	99.38
Inland*	8,639	3,538,000	6,463,000	54.74	11,239	7,455	14,162	372,679	751,496	49.59	271,503	280,474	96.74
MCA**	29,837	9,051,000	16,400,000	55.19	24,216	21,719	44,847	958,875	1,786,867	53.66	653,685	620,236	99.87
National	31,449	19,420,000	39,997,000	48.55	50,498	18,668	355,874	2,395,624	5,283,641	45.34	951,221	835,974	98.22
Northeast	36,331	6,989,000	12,716,000	54.96	10,106	16,619	34,933	693,826	1,271,608	54.56	407,176	400,021	96.23
Northwest	79,984	53,298	80,961,000	65.83	195,033	206,737	672,522	6,188,026	10,252,767	60.35	1,650,964	1,593,640	98.99
Trans Pac.	8,886	1,076,000	2,466,000	43.63	93	93	1,216	95,445	196,158	48.66	88,087	70,953	100.00
TWA	153,440	111,190,000	152,838,000	72.75	763,519	569,239	1,244,252	13,251,540	19,929,370	66.49	4,024,480	3,929,529	99.26
United	244,918	142,033,000	182,668,000	77.75	1,038,002	817,458	2,683,379	18,165,490	27,395,936	66.31	4,703,127	4,479,081	99.82
Western*	50,158	18,975,000	30,555,000	62.10	79,939	45,140	61,660	1,998,221	3,275,800	61.00	780,451	750,924	99.16
TOTALS	1,547,841	737,665,000	1,094,450,000	67.40	3,767,098	3,236,533	10,519,241	88,802,545	143,985,363	61.67	28,366,397	27,414,380	99.01

* Operations of Western and its subsidiary, Inland, should be considered as consolidated, although reports are filed separately as shown here.
 ** Figures do not include operations of feeder segment (Route 105) recently awarded MCA by CAB in the Parks Air Lines Investigation Case. Figures covering Route 105 are carried separately on feeder airlines summary sheets.
 *** Includes air parcel post.

U. S. Feeder Airline Revenues & Expenses for August, 1950

AIRLINES	TOTAL OPERATING REVENUES	PASSENGER REVENUES	MAIL REVENUES	EXPRESS REVENUES	FREIGHT REVENUES	EXCESS BAGGAGE REVENUES	NON-SCHEDULED TRANSPORT REV.	TOTAL OPERATING EXPENSES	AIRCRAFT OPERATING EXPENSES	GROUND & INDIRECT EXPENSES	NET OPERATING INCOME
All American	\$ 311,327	\$ 173,433	\$ 131,225	\$ 4,406	\$. . .	\$ 844	\$. . .	\$ 290,654	\$ 145,681	\$ 144,973	\$ 20,673
Bonanza	68,011	23,769	43,440	73	407	213	70,112	70,112	25,547	44,565	-2,098
Central	56,610	6,582	46,974	. . .	. . .	66	2,958	67,906	32,296	35,610	-11,297
Empire	94,272	41,208	50,684	441	. . .	275	1,520	84,302	47,528	36,774	9,970
Frontier*	325,798	106,075	209,949	1,341	4,896	779	922	315,706	155,416	160,290	10,092
Mid-West	45,180	4,437	40,667	. . .	. . .	29	39,325	14,255	14,255	25,070	5,855
Piedmont	273,332	150,247	113,726	2,463	4,094	1,320	250,799	136,491	134,308	22,533	22,533
Pioneer	275,318	169,550	98,283	650	3,609	1,326	462	265,381	125,212	140,169	9,937
Robinson	95,345	59,179	32,678	1,683	788	119	883	101,668	56,653	45,015	-6,323
Southern	108,329	31,078	74,408	1,451	. . .	159	573	126,315	70,406	55,909	-17,986
Southwest	205,412	123,351	66,549	1,916	4,160	327	8,076	165,375	65,438	99,937	40,037
Trans-Texas	216,107	67,184	141,915	594	1,719	466	3,764	198,704	92,320	106,384	17,402
Turner	57,629	10,752	34,683	1,069	. . .	44	11,082	57,634	32,791	24,843	-5
West Coast	125,404	73,542	48,509	692	1,130	176	473	101,136	45,581	55,755	24,068
Wiggins	26,480	2,530	23,941	. . .	. . .	9	. . .	23,285	10,810	12,475	3,195
Wis. Central.	161,488	47,580	111,463	1,967	. . .	297	. . .	144,025	75,957	68,068	17,464
TOTALS	2,446,045	1,090,497	1,269,094	18,746	20,803	6,449	30,713	2,302,527	1,132,382	1,170,145	143,517
Hel. Air Serv.	32,288	. . .	32,288	. . .	. . .	. . .	. . .	29,617	17,944	11,673	2,671
Los Angeles	38,282	. . .	38,282	. . .	. . .	. . .	. . .	33,687	21,607	12,080	4,996

* Formerly Chas.enger Airlines and Monarch Air Lines. Companies have merged and are now operating under name of Frontier Airlines, Inc.

Alaskan Airline Traffic for January-June, 1950

AIRLINES	REVENUE PASSENGERS	REVENUE PASSENGER MILES	AVAILABLE SEAT MILES	PASSENGER LOAD FACTOR	MAIL TON-MAILES	EXPRESS TON-MAILES	FREIGHT TON-MAILES	TOTAL TON-MAILES TRAFFIC	AVAILABLE TON-MAILES FLOWN	% AVAILABLE TON-MAILES USED	REVENUE PLANE-MAILES	SCHEDULED MILES	% SCHEDULED MILES COMPLETED
Alaska*	8,915	4,009,000	18,459,000	21.71	87,543	8,276	1,117,275	1,670,673	3,296,433	50.68	889,936	437,745	94.59
Alas. Const.	10,679	948,000	1,924,000	49.27	12,844	7,798	8,585	115,566	241,957	47.76	273,195	219,195	89.10
Consolid.	1,171	92,000	355,000	25.91	3,640	. . .	2,014	15,860	39,593	40.05	94,918	59,258	91.62
Elia	12,860	762,000	1,628,000	46.80	3,089	5,950	. . .	82,531	161,635	51.06	221,120	132,126	91.39
N. Consol.	5,898	1,286,000	4,161,000	30.90	51,119	2,757	129,601	319,211	647,943	49.26	486,082	368,330	91.65
Pac. North.	11,047	4,141,000	10,932,000	37.87	61,112	114,103	. . .	583,829	1,229,175	47.49	527,665	427,220	96.64
Reese	1,012	773,000	1,366,000	56.50	29,274	. . .	44,560	157,918	239,040	66.06	153,641	112,704	100.00
W. Alas.	2,098	565,000	1,698,000	33.27	49,655	. . .	92,894	200,489	330,063	60.74	373,169	310,321	85.32
TOTALS	53,680	12,576,000	40,525,000	31.03	298,276	138,884	1,394,929	3,146,077	6,185,839	50.85	3,019,798	2,066,899	92.52

* Figures for Alaska Airlines are for the five months ending May 31, 1950. June figures are not yet available.

CAA Standardizes Markings For Taxiway Identification

By KEITH SAUNDERS

ACTING in response to recommendations from the Airports Advisory Committee, the Air Line Pilots Association and other groups, CAA's Office of Airports came out this month with a set of tentative standards for taxiway route markers to serve the dual purpose of identifying taxiways and of guiding pilots along them.

The proposed standards were developed by CAA after a careful review and analysis of previous studies and tests on the subject and after the Port of New York Authority, at its own expense, had built and tested several types of markers at New York International Airport.

The preliminary draft was completed early this month and has been sent to all CAA regional offices for review and comment. It is thought that the issuance of a Technical Standards Order covering such markers will be possible by next January or February, at the latest.

Day and Night

The proposed standards apply to both day and night markings for taxiing routes and specify the type of signs to be used and their placement on the airport. The markers will be used in conjunction with taxiway lighting systems and will be a component part of such systems, not a replacement for them. At airports where route markers are considered necessary only for daytime operations, painted signs will be permissible, but they must conform to CAA's standards for marking and placement.

CAA has intentionally made the standards flexible so they may be applied to either small airports or large terminal-type airports, and also so as to permit installations by stages, i.e., putting in a minimum number of markers initially and then expanding the system with the growth of the airport and as funds become available.

The lighted markers will be made in one standard size, with overall dimensions of 24 inches high by 50 inches long by eight inches deep. A sign will consist of an open housing with lamp sockets and wiring, removable and interchangeable side panels for the sign markings, a base plate and a base. It will be set in a concrete base, and for safety purposes

will have a breakable coupling. For series circuits and for 600-volt multiple circuits, an insulating transformer will be required and this will be mounted in the base of the sign.

Provisions are made in the sides of the housing for inserting the removable sign panels in much the same manner as letters are inserted in a theater marquee sign.

Low-Cost Upkeep

Conventional 40-watt, inside frosted, 120-volt incandescent lamps will be used, which will make maintenance relatively simple and inexpensive. Experimental installations using gaseous tubing and gaseous tube lamps did not show any increase in legibility over the incandescent type lamp and were considerably more expensive to build and to maintain.

The removable panels are metal and contain translucent letters, numerals or arrows of the embossed type. They are made in standard sizes, so the necessary combinations

of letters and numerals or arrows can be inserted in the housing. The markings will be of amber (similar to international orange) translucent plastic material similar and equal to Lucite. After a number of tests, this color was chosen as being the most distinctive, particularly when viewed at night with a surrounding background of clear runway lights and blue taxiway lights.

The interior of the sign is painted with two coats of outdoor-type white enamel. The sign exterior, except the markings, is painted black. When assembled, the complete sign is weatherproof.

In cases where painted signs are deemed adequate instead of lighted signs, the materials and markings should conform to CAA specifications, and installations should be made in accordance with CAA standards as to installation methods and locations.

48 Panels

CAA's program calls for 48 standard panels, as follows: 22 alphabet letters ("I," "O," "Q" and "W" not used to avoid possible confusion with numerals or because of poor legibility) to be used in identifying taxiways; 10 numerals (0 through 9) to be used in identifying runways; six types of horizontal, vertical and slanting arrows; a dash symbol; blank panels in four sizes to be used in con-



NWA Lounge—A passenger lounge with a Far East atmosphere is Northwest Airlines' recently completed "Stratocruiser Room" at the Seattle-Tacoma International Airport for the use of passengers while waiting for their flights. The room is broken into small seating groups or conversational areas similar to this one shared by NWA Stewardess Lauraine Nohr and Mrs. Joy Paul, Seattle. It features Oriental, South Seas and Alaskan decorations and motifs. Lounge was designed by NWA's plant and equipment engineering division, with Butler-Zimmerman of New York as design consultants.

junction with certain markings; and five destination panels to point the way to the ramp, the cargo apron, the military area, the customs area and the parking and gas areas.

All taxiways will be identified by letters of the alphabet rather than numerals, since pilots are accustomed to numerals as runway identifiers. Each taxiway shall be identified by one letter or, in some cases, a double letter for its entire route. To keep the number of lettered taxiways to a minimum at a given airport, a taxiway route from an apron, for example, to the end of a runway should be considered as one taxiway, even though the route consists of a number of taxiway sections due to intersections with other runways and taxiways.

This principle, incidentally, has been recommended by Airport Traffic Control in order to reduce the number of instructions from the controller to the pilot.

Clockwise Sequence

Identification letters are to be assigned to taxiways in a clockwise manner as far as the taxiway layout at a particular airport will lend itself to this procedure. Appropriate letters

will be reserved for proposed future taxiways included in airport master plans.

CAA realizes that the traffic at every airport will not justify installing a complete set of signs, which at a conventional three-runway airline-served field might run to as many as 65 signs. Hence the flexibility which will permit installations by stages.

In this connection, studies have shown that certain signs are, in general, more necessary than others in controlling ground traffic. Accordingly, CAA has adopted the following priority guide for installing taxiway route markers:

1. **Entrance signs**, to mark each entrance to a taxiway.

2. **Outbound guidance signs**—both taxiway and runway identification signs with directional arrows.

3. **Holding signs**, to hold taxiway traffic for clearance before entering or crossing a runway.

4. **Destination signs**, to be located along taxiways, runways, or at junctions and intersections as required.

5. **En route signs**—taxiway identification and directional arrow symbols along the taxiway route, such as on curves and the taxiway.

At present, CAA engineers are con-

sulting with sign and lighting manufacturers, so that when the new standards are adopted cities desiring such signs will be able to obtain them.

Initially, it is possible the cost will be over \$225 per sign, including the transformer, base, wiring and installation costs. The painted signs, of course, will be much less expensive than this. In any event, the CAA will honor the cost as an allowable project cost eligible for a Federal-aid grant under the Federal Airport Act.

CAA AIRPORT GRANTS

For the two weeks ended October 27, the Civil Aeronautics Administration made Federal-aid airport grant offers totaling \$261,470 to ten communities, as follows, with airport classes in parentheses:

California: Bidwell Field (3), Red Bluff, \$8,792.

Montana: Missoula County Airport (4), \$10,278; Ophelm Airport (1), \$3,380; Sidney Airport (1), \$16,871.

Nevada: Tonopah Mun. (7), \$17,522.

North Dakota: Leeds Mun. (1), \$3,600.

Oregon: La Grande Mun. (3), \$7,030.

Pennsylvania: Harrisburg State Airport (4), \$121,835.

Washington: Gelger Field, Spokane (7), \$61,412.

Wisconsin: Phillips Mun. (2), \$10,750.

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F. H. Scott, New York, N. Y., 225 Broadway; C. B. Anderson, Kansas City, Mo., 1438 Dierks Building; Lee Curtin, Hollywood, Calif., 7046 Hollywood Blvd.; Frank Deak, P. A. Miller, Central District Office, Engineering Development and Production, Columbus, Ohio; Headquarters, Toledo, Ohio.

Ready in 1952:

Swiss Completing Construction On Modern Zurich Airport

There have been noteworthy improvements in the past two or three years at airports around Europe—at Melbroek Field (Brussels), at Orly Field (Paris), and at Schiphol Airport (Amsterdam), to mention a few of the better-known airports.

The airport that bids fair to top them all on the continent, however, is the Zurich-Kloten Airport, on which the Canton of Zurich, the Swiss Federal Council and the cities of Zurich and Winterthur are spending approximately 109,000,000 Swiss francs, or the equivalent of \$25,000,000.

The airfield itself already is one of the finest in Europe, conforming to the ICAO standards for an intercontinental airport, and is readily capable of expansion. The terminal building, now under construction and slated for completion in 1952, will be one of the finest in the world.

Built on the 930-acre site of a former artillery range only six miles from the center of Zurich, the new airport has three runways: an instrument runway 8,500' x 250', and two other runways 6,200' x 200' and 5,000' x 150'.

Easily Expanded

Corresponding in its present stage of development to Class B of the ICAO norms for an intercontinental airport, Zurich-Kloten can easily be expanded to Class A standards by the lengthening of two runways.

In preparation for this stage of development, the present runways have been dimensioned for aircraft weights up to 300,000 pounds, and a total of 1,272 acres has been purchased. If necessary, parallel runways could be built in all directions on the present site.

The apron, situated at the foot of a hill, is 1,160 feet long and 400 feet wide. Airline repair and maintenance work is carried out in a 500' x 125' plant with adjoining workshops. One 250' x 216' hangar has been completed and another is under construction, with workshops separating them, while there is ample space for further

hangar construction if required. A special engine shop and an engine test stand will complete the buildings for airline traffic. Installations for non-airline aircraft will be provided on the other side of the airport.

Flight Control Aids

Zurich-Kloten is equipped with modern visual, electronic and flight control aids, including all the usual ILS equipment. Precision and surveillance radar also is to be purchased and put into operation by 1952.

The terminal building is the last principal item in the first stage construction program for the airport. Construction on this was begun this year after a long period of careful studies and about 25 changes in the original designs. The layout of the building is in many aspects similar to that of the widely heralded terminal at Washington National Airport, except that at Zurich outgoing and incoming passengers will be



Switzerland's Finest— New Zurich-Kloten Airport is one of the finest in Europe today, meeting ICAO standards for a Class B intercontinental airport and having ample land area for expansion to Class A size and for parallelization of runways. Field is six miles from center of Zurich and is costing \$25,000,000.

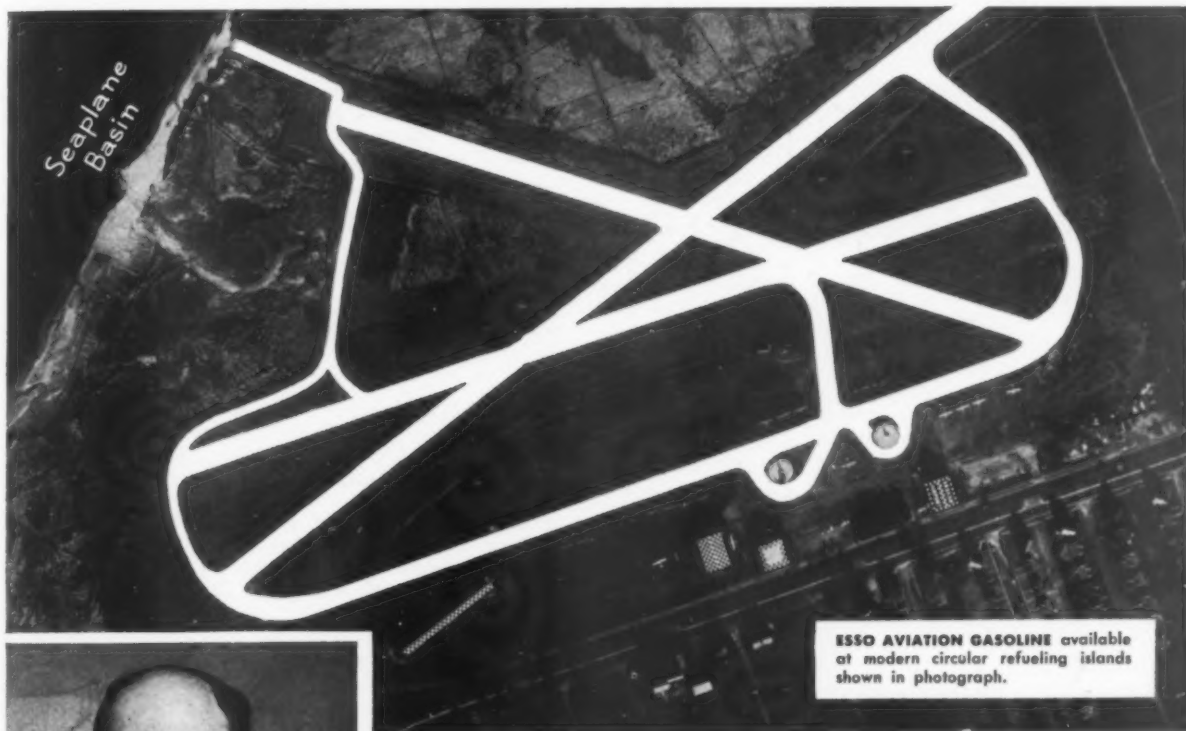


Zurich Terminal— New multi-million dollar terminal building at Zurich-Kloten Airport is pictured from the field side in the architect's model on the left, above, while



the aspect from the entrance side is pictured on the right. Patterned somewhat after the terminal at Washington National Airport, the Zurich building is scheduled for completion in 1952.

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JULIUS GOLDMAN, President and General Manager, Revere Airways, Inc., which own and operate Boston-Revere Airport. He is a member of NAA, QB, AFA, and Kiwanis.

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THAT FEELING OF WELCOME is strong at Boston-Revere Airport, where the service and facilities mean real comfort and convenience to flyers. It is the largest close-in private airport and provides the only seaplane base in the greater Boston area. It is only four miles from downtown Boston and is located directly on main highway, C-1, connecting with U. S. Route 1. A good restaurant... complete maintenance and repair facilities... and convenient transportation are available at this airport — where good service teams up with high-quality Esso Aviation Fuels and Lubricants.

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AIRPORTS

handled on separate levels. For mail and cargo, a special building is being projected.

Construction work at Zurich-Kloten was started early in 1946. Only two years later it was possible to put the main runway into operation, and by November, 1948, it was possible to shift the entire commercial air traffic of Zurich over from the old airport at Dubendorf to the new field.

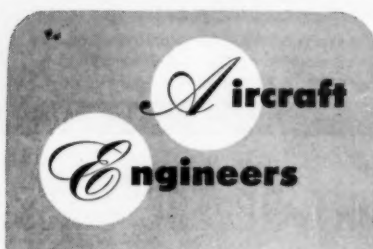
Traffic at the field now averages 2,500 flights and 20,000 passengers a month.

AIRPORT PEOPLE

New airport manager at the Elkhart (Ind.) East Side Airport is **Robert Sprankle**, while **H. Walter Schreiber** is the new manager at Greencastle (Ind.) Municipal.

William H. Sparrow has resigned as manager of the New Bedford (Mass.) Municipal Airport, a post he had held for four years. No successor has been named.

Jack Smoligan, formerly of Omaha, is the new airport operator and manager at Red Oak, Iowa.



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AIRPORT NEWS DIGEST

Cleveland OK's Bond Issue: Cleveland voters finally approved a \$4,000,000 airport bond issue, but the margin was close—55.26% favorable votes, with 55% required to carry. So Jack Berry, commissioner of airports, should finally get that new terminal he has needed for so long. Profiting from defeats in two previous elections, the Clevelanders waged an aggressive and intelligent campaign this time and it worked.

Single-Strip Policy: CAA's Office of Airports has been adhering closely in the past to the single-strip or uni-directional runway policy formally announced last year. During the past three years, Federal-aid funds have been made available for the construction, extension or improvement of a single runway at 266 airports, and parallel or dual runways have been aided at only one location, Atlanta.

In the Federal Airport Program for fiscal 1951, there are 31 single runway projects and one parallel strip project, the latter being at St. Croix, Virgin Islands, where the terrain makes two strips necessary. Operators of larger airports with a sizeable volume of airline traffic needn't be concerned, however, because the single-strip policy won't be applied in such cases. But CAA will tend increasingly to press for and to limit its aid to parallel or uni-directional runways at the larger fields.

TERMINALS

- **San Antonio city council** has approved preliminary plans for a \$500,000 airport administration building and has authorized the architects, Ayres & Ayres, to proceed with work on final plans and specifications.
- **Knoxville received a low bid** of \$353,355 for an addition that will more than double the size of the airport administration building.
- **Lewiston, Idaho, in cooperation with Nez Perce County**, has let contracts totaling \$167,116 for construction of an airport administration building.

CONTROL TOWERS

- **Kansas City has let contract for construction** of a control tower to be located atop a new office and shop building costing \$283,000 at municipal airport.
- **Wilkes-Barre/Scranton Airport is to have a new tower** costing about \$46,000. Contract is about to be let.

PLANNING

- **Cincinnati is moving ahead on its proposed Blue Ash Airport project.** A \$162,000 contract to prepare engineering plans for design of the field has been awarded to the firm of Vogt, Ivers & Seaman.

RUNWAYS, GRADING

- **Philadelphia International Airport is adding a \$2,500,000 extension** on the instrument runway and hopes to have it completed by the end of the year.
- **Logan International Airport, Boston, has closed Runway 4L-22R** for landings and takeoffs for purposes of resurfacing. Portions of the runway will be used for taxiing purposes only during resurfacing. Runway 4R-22L has been commissioned as an instrument landing runway and opened to its full length of 10,022 feet. It is fully implemented with ILS and surveillance and precision radar.
- **Tuscaloosa, Ala., has let a contract for \$119,294** for construction of a 4,000-foot paved runway and other improvements at Van de Graaff Airport.
- **Shawnee, Okla., has completed grading, drainage and runway work** at its municipal airport.
- **Owosso, Mich., has started paving on a 500-foot extension** to the east-west runway. Drainage work, first step in a \$152,000 airport improvement and expansion program, was completed last month.

DEDICATIONS

- **New \$400,000 administration building** at Dress Memorial Airport, Evansville, Ind., was dedicated recently, as also was a new terminal at Yuma County (Phoenix) Airport and a new runway at Douglas, Wyoming.

How Airport Fires Can Be Prevented

By BARBARA J. WARD

(Editor's Note: This is the first of two articles on fire prevention at airports. The second, on fire-fighting equipment, will appear in a future issue.)

THE DREADED word in aviation is fire. In the air it can mean a race against time versus altitude and distance to a landing field. On the ground it can mean the destruction of a hangar and the equipment in it in a matter of minutes.

But "past is prologue" and the danger points of the past can point to prevention at your airport. Unthought-of sources of fire in the past—an extension light hanging near a dope-covered wing, an unshielded length of wire under a leaking hangar roof, a short-circuit in the battery box of a stored aircraft—provide a check list for the future. Here, collected from information of the National Fire Protection Association and insurance companies, are the conditions which have caused the "out-standing" airport fires of 1948-1950.

• **Drop-cord light bulbs** close to inflammable doped surfaces of a plane or on the fabric of a seat have caused several fires in the past few months.

At Springville, Utah, the airport manager opened up for the day and turned on the electricity. He smelled smoke and in the hangar found an

expanding brown spot on the fabric of a Beech D-18S where the drop cord lamp was hanging. As he watched, the spot in the cellulose-nitrate dope finish expanded, the fabric broke and burst into flames and spread over the entire aircraft almost instantly.

It spread to six other stored aircraft and was aggravated by gasoline and magnesium flares. Radiant heat from the burning 60' x 80' wood-frame, steel-clad hangar ignited three aircraft on the ramp, two of which where 150' away.

Prevention: a fire resistant dope aircraft covering and an outer globe over the light bulb to prevent heat radiation.

At Lima Airport, Ohio, a mechanic in the hangar was on his back on a floor scooter with an extension light bulb, protected only by a wire screen, beside him. He had just removed the drain petcocks from a Beechcraft when some fuel dripped on the light. Contact of the cold gasoline with the hot light bulb caused the bulb to burst and ignite gasoline vapors.

The mechanic succeeded in putting out the fire in his clothing and two planes were moved to safety, but half the hangar burned for \$29,000 loss.

Prevention: a tight outer globe on the light.

• **Electrical short circuits** in stored aircraft or in aircraft undergoing

maintenance are a constant danger.

At Downtown Airport, Oklahoma City, Okla., lack of insulation between the metal lid of the battery box and the lead wires resulted in the rear fuselage of a Piper Cruiser bursting into flames. A mechanic nearby saw the fire and volunteers used carbon dioxide to hold the flames in check while 21 of 28 aircraft were moved out of the hangar in seven minutes.

The hangar had doors on three sides, making every area accessible and downwind doors were opened first and the planes pulled out, then the side doors were opened and planes removed. The fire department extinguished the flames with water booster tank hose lines supplemented by water from a 500-gallon tank truck (the nearest hydrant was three blocks away).

Prevention: insulate battery wires.

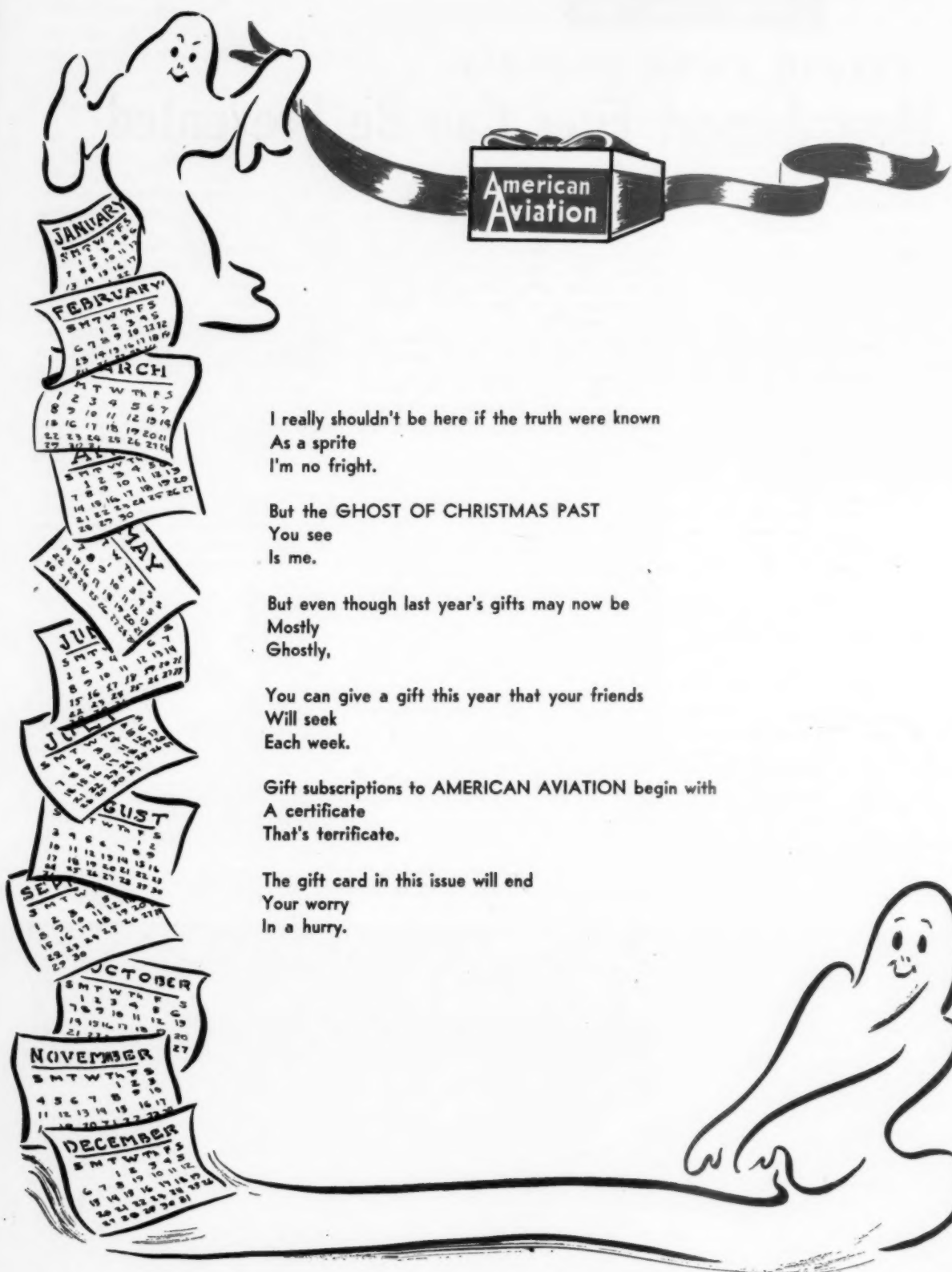
A spark from the battery of a twin-engine Cessna undergoing maintenance at Daytona Beach Airport, Fla., ignited gasoline vapors from a fuel spill on the hangar floor. Fire spread to three planes, with an estimated damage of \$40,000.

Prevention: remove batteries prior to maintenance work. Clean up any spills immediately and use drip pans where possible.

Attempted theft of an aircraft radio from a Cessna UC-78 is be-

FLAMES FROM a burning plane sent this \$125,000 hangar at Utica, N. Y., up in flames. Only automatic fire protection would have saved the hangar.





I really shouldn't be here if the truth were known
As a sprite
I'm no fright.

But the GHOST OF CHRISTMAS PAST
You see
Is me.

But even though last year's gifts may now be
Mostly
Ghostly,

You can give a gift this year that your friends
Will seek
Each week.

Gift subscriptions to AMERICAN AVIATION begin with
A certificate
That's terrificate.

The gift card in this issue will end
Your worry
In a hurry.



SHORT CIRCUIT at the battery box of this stored Piper Cub at Downtown Airport, Oklahoma City, caused fire which spread and destroyed four other aircraft.



FLASH FIRE at Glasgow, Montana, where mechanics were doping the wing of an aircraft, spread quickly. Cause of the spark was undetermined, but segregation of maintenance work from stored aircraft would have saved 16 other planes.

lied to have caused an electrical short-circuit spark which set the plane on fire.

Prevention: remove the battery when aircraft are stored, and particularly from aircraft involved in accidents.

• **Nose-down storage of aircraft** contributed to a \$220,000 hangar fire at Red Bank Airport, N. J. Cause of the fire, which originated in the parachute room, was possibly careless disposal of a cigarette or sparrows carrying a lighted cigarette into a nesting area above the parachute loft. The parachute room was of wood and, although the rest of the hangar was metal, fire spread quickly, complicated by gasoline tank explosions.

Prevention: in room sections of hangars, use wall material of about one hour's fire resistance to allow time to remove aircraft and use fire fighting equipment. Don't use angle storage of aircraft which gives congestion and a position conducive to increasing fire.

• **Lightning** struck an ungrounded windsock pole on a brick and wood hangar at Washington Park Airport, Homewood, Ill., during a thunderstorm and resulted in total destruction of the hangar by fire. Another instance occurred at Airparks, Inc., Summit County, Ohio, when lightning struck the wood gables on a 22-ft.-high hangar and fire broke out to spread through openings in the hollow block walls separating the hangar from two adjoining buildings. All three buildings and seven planes were destroyed. A third lightning strike on an ungrounded windsock pole at Prosperi Airport, Ill., knocked

out most of the roof gables on a 22 ft. hangar and charred the wood.

Prevention: ground any steel windsock poles with grounding cables. And ground hangars which stand alone as the highest structure in an area.

• **Ice** was the innocent cause of another fire. It had formed three to four feet thick on the roof of a lean-to and employees attempted to melt it off with oil fires set in open smudges on the floor. A spare wing on the side of the lean-to ignited and flames

quickly spread to three of six stored aircraft.

Prevention: care.

• **Static electricity** can build up on clothing—particularly when a person wears rubber boots—or on equipment. At Teterboro Air Terminal, N. J., the night watchman noticed gasoline dripping from the engine of a Taylorcraft in angle storage. He proceeded to open the cockpit door to turn off the gas when a blinding flash occurred which momentarily knocked him over. The gas-air mixture near the cabin door was ignited



Accidental release of an aircraft flare caused total loss of this Cessna UC-78 and \$25,000 hangar damage, at Chicago Municipal Airport, Ill.

LOCAL OPERATIONS

by a static spark from the watchman or the ungrounded aircraft.

Prevention: turn fuel "off" in stored aircraft. Keep floors clean of fuel spills.

A static spark set fire to a four-engined Canadian aircraft during refueling. The aircraft was not bonded to the fuel tanker, which may have caused the spark. Another theory is that static electricity built up on the clothes of the airman who had been sweeping snow from the wings and discharged during refueling.

Prevention: during refueling, always ground the gas nozzle to the aircraft, the aircraft to the earth, and the aircraft to the fuel tender. Also, it is possible that mechanics working with fuel should wear "grounding" shoes, as required in some industries.

• **Release of flares** from Cessna UC-78 aircraft in hangars has caused fires at both Chicago Municipal Airport, Ill., and Logan Airport, Mass. In both instances, the flare switches apparently had been left on and when mechanics installed a new battery or attached an auxiliary power unit, the flares released.

Prevention: check flare switches prior to maintenance work.

• **Properly constructed fire walls** in hangar shops would have minimized the fire loss at Sky Ranch Airport, Colo. A short circuit in electrical wiring in the stock room adjacent to the hangar caused fire which ran the length of the hangar on the lean-to side, and stopped only when it reached a fire wall of the boiler room. The metal partition between the shops and hangar would have segregated the fire, except the parts window lacked a shutter and sparks traveled through to ignite stored aircraft.

Prevention: fire walls extending to the roof in shops and a fire resistant shutter in the stock room.

• **Welding sparks** cause a major proportion of lightplane fires and have cost hundreds of thousands of dollars in hangar damage. The spark and the combustible material will be present in any circumstances.

Cautions: (1) do any welding out of doors; or if it must be done in the hangar, remove other aircraft, (2) provide a hose line as a safeguard against fabric ignition by heat or sparks, (3) use flame-resistant fabric finishes such as those with cellulose acetate base, (4) have fire extinguishers nearby, and (5) be sure metal tubing is wrapped properly to avoid heat conduction.

• **Flammable stores** such as paints are an invitation to total loss when kept

Hangar Fire Check List

- Grid grounding connections in hangar floor for static discharge of aircraft.
- Grounding of steel wind-sock poles, etc., against lightning.
- Electrical wiring comply with National Electrical Code (NFPA), with explosion-proof equipment used in areas of vapor concentration.
- Fire walls separating each "stall" in nose hangars.
- Fire-resistant hangar construction, with protection of maintenance and repair areas. Heavy wooden girders are said to give better support during fire than steel girders, which may buckle in the heat.
- Fire resistant construction near heaters. No use of open-flame heaters.
- Hangar hand fire extinguishers of minimum capacity: carbon dioxide—50 to 100 lbs., dry chemical—20 to 30 lbs., foam—40 gallons.
- Automatic fire alarm.
- Gas pit located away from hangar.
- Buildings spaced to prevent fire spread.
- Dry grass and bushes removed from hangar and tie-down areas.
- Paints, thinners, etc., stored in separate, well-ventilated building.

in the hangar with aircraft. Fire from an unknown source broke out at Martin Aircraft Service, in California and was augmented by large quantities of stored paints and lacquers, resulting in the total loss of the hangar and 23 Piper Cubs, totaling over \$150,000.

Prevention: store all paints, dopes, thinners, etc., in a separate shed away from the aircraft area.

• **Oily rags** can ignite themselves. At Carswell Air Force Base, Texas, fire originated in the rag box, ignited a wood locker, spread on solvent, film cement and ruptured oxygen lines, and was out of control when fire equipment arrived.

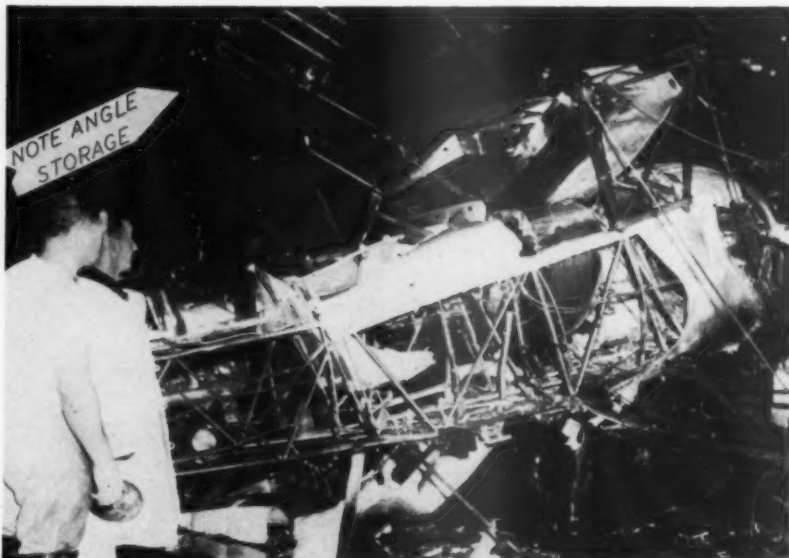
Prevention: keep oily rags in a covered metal container, emptied daily.

• **Washing in gas** leveled a war surplus hangar at Skytel Airport, New Mexico. A mechanic was washing his overalls in a can of gasoline eight feet from an open flame heater when vapors ignited and spread from the shop through the hangar.

Prevention: take it outdoors.

• **Improperly installed heaters** ranked close to welding as a fire hazard. At Anchorage, Alaska, an employee noticed flames around the pipe in the wallboard. The furnace room was undetached and apparently the combustible wallboard had not been safely cut away where the smoke pipe passed through the material. Loss was about \$125,000.

Prevention: install heater in a detached room with fire resistant wall material.



Nose-down aircraft hanging contributed to spread of a fire at Red Bank Airport, N. J. Fire started in an unsegregated parachute loft and blazed through the all-metal hangar before more than three planes could be removed.

LOCAL OPERATIONS

THE Washington View

By Barbara Ward



WHEN CONGRESS reconvenes November 27, two aviation training bills now in committee have only a slim chance of coming to a vote. These are the **Civilian Airman Training Act of 1950** (S. 4164 and H. R. 9727) which would provide \$150,000,000 for an enlarged "CPT" program administered by CAA representatives to train civilian pilots and technicians; and the **Air ROTC Bill** (S. 3846 and H. R. 9019) to allow college Air ROTC units to contract with nearby civilian flight schools for flight training of ROTC cadets.

Few persons realize how small our pool of aviation-trained young people is. The total of 330,000 valid current medical certificates issued for commercial, private and student licenses as of July this year looks good on the surface. But of this group, there are only about 11,500 in the 18-20 year age group. Only 3% of the total.

Some of these young people may never have flown, some are dual and some have soloed. Many have other interests than aviation and a good proportion of the boys will soon enlist or be drafted into the military service, leaving only a small number to obtain pilot licenses. To prevent our pool of pilots in 1960 from consisting mainly of middle-aged World War II veterans, some aviation-minded persons are crusading to provide year-by-year aviation training of young people. Their success, and the future of the bills now in Congress, will depend mainly on the support they get from the "grass roots."

One out of five operators appears to be interested in the Air Force's new basic flight school to be opened at Greenville, Miss., and operated by a civilian contractor. At last count 1,142 requests for bid information had been received by the Air Materiel Command. Bids are due on December 4.

This will be the first Air Force training field operated by civilians since the end of the war, and results will be weighed against the Stanford Report findings that civilians can turn out a comparable pilot cheaper. But Greenville looks like a case for industry indigestion. It has 387 buildings spread over a large area, is in a low-elevation, early-morning-fog section of the country, and is some distance from town.

Among other things, the contractor is asked to provide Western Union service, staff a weather office, and maintain a storm radar-scope, auxiliary airfields and a 25-bed hospital. In the light of all this, the Pentagon's estimate that it should require about 600 civilians and military personnel to operate a 450-cadet basic training field sounds reasonable.

CAB Chairman Delos W. Rentzel has the secondary role of heading the NSRB task force to plan use of civilian aviation facilities in mobilization and has just appointed an assistant, **Charles I. Longacre**, to act as key man in coordinating plans.

The Maintenance and Overhaul Committee, headed by **Max Balfour** of Spartan School of Aeronautics, Tulsa, Okla., and the Training Committee headed by "**Bevo**" **Howard** of Hawthorne Flying Service, Charleston, S. C. have held initial meetings in Washington. Military representatives have yet to be appointed.

CAA's Aviation Advisory Development Committee, composed of leading members of civilian aviation, met in Washington November 16 and 17. Purpose was to work out additional details for using civilian aviation in a war emergency. The ADAC recommendations in "America's Civil Air Power" came back from the National Security Resources Board with the request for further study.

Martha Ann Woodrum, pretty operator of Woodrum Flying Service at Roanoke, Va., is the first woman appointed to the board of the fixed base operators' National Aviation Trades Association. She kept her flight school operating through and since the war and won the respect of NATA operators to the extent that they made her one of their industry vice presidents.

NOVEMBER 27, 1950



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Cross-Country

----- WITH LOCAL OPERATORS -----

By Page Shamburger

What's Wrong? All the ideas of the "behind-the-desk-operator-improvement" brain children have been tried by the operators in the New England Section . . . and how is business? **ROTTEN.**

Operators or their lack cannot be blamed for the ever increasing number of closed airports. The consensus brings forth this answer . . . simply, the public needs an air education.

The anticipated interest in flying, in learning to fly and in buying airplanes is not here. The GI students, so long a mainstay of the operators, are gone, and the percentage of GIs returning to fly after Uncle Sugar turned over the chit is alarmingly low.

Two basic reasons: (1) the GI's didn't realize the actual cost and now are too deeply involved in the process of buying homes, automobiles, and supporting new wives to spend the necessary eight or ten dollars to fly; and (2) the tried and true human trait that "Anything that's for free is no good anyway." If an operator can find a GI with the necessary allotment and the desire, VA approvals are next to impossible to get.

Private or cash students were sadly neglected during the GI boom and are not, now, in sufficient numbers to support an airport. **Piper's Cross Country System** of teaching the businessman to fly is being used successfully by a number of operators. **Maurice Taylor** of Oneota, N. Y. has trained this way since the plan came out and has a number of completely satisfied students. The majority are in their forties and average considerably older than any previous year.

More hours are needed before soloing, but the student thinks more about where he is going than about getting into the wild blue yonder. And after solo, the student is a safe and constant renter and more often than not a plane buyer. **Maurice** and his wife specialize in student instruction and get full cooperation from **Paul Enggard** of **Mid-State Aviation** at Norwich, Conn. **Maurice** sends charter work to **Paul** and **Paul** sends students to **Maurice**. Such a jolt to see operators patting each other on the back instead of cutting throats! **Paul** has one of those glorious things—a courtesy car. And good food in the airport restaurant.

* * *

Hauling Bodies. For the best hangar-flying tales imaginable, listen to **Duane Johnson** of **Carbondale-Clifford Airport**, in Pennsylvania. **Duane** is do-

ing everything to keep aviation before the public in his area. Besides writing a weekly column for the local newspaper, appearing on radio quiz programs, and having three 15-minute programs directly from the airfield, he has put a lot of effort into interesting the local civic clubs. Recently, five runners-up were chosen in the **Carbondale Jay Cees Beauty Contest**, and the best on a flight check was queen and given flying lessons. The **Jay Cees** also raffled off a week's trip to Miami, via **Duane's Navion**. What better way to get a paid vacation? . . .

Unique way to make a buck in this business! **Roger Atwood** at **Northampton, Mass.**, is chartered by the local undertaker to transport bodies to their home cemeteries. Seems quite a number of travelers die away from home and by air is the quickest way to get back. **Robert Decker**, of **Cozine Field, Rhinebeck, N. Y.**, is another body carrier. Idea . . . if you don't mind quiet company, see your local undertaker. At least you'll not get the usual gripes about delay, bad weather, or the need of an ice cream cup.

With all types of advertising tried, the best seems to be a draw between direct mail and the telephone's classified section with newspapers a close second. Out of all the operators seen, only one—**John Culver** of the **Fli Rite School** at **Plattsburg Municipal (N. Y.)** has got definite results from radio. **John** has a spot announcement before the 7 p.m. news and knows its brought in students. . .

* * *

White Crosses Lacking. **T o m McNary**, **Cortland Municipal, N. Y.**, finds the many closed airports extremely dangerous because so few have gone to the trouble to paint white crosses. Operators and CAA representatives are responsible—and it needs to be remedied. . .

York-Whitehull in **York, Pa.**, has the convenience of a hotel and a restaurant practically on the runways. **George Whitely**, justifiably proud of his swell airport, is one of those friendly operators who make you glad you came by. He and his partner go out of their way to give you the excellent service you like but can't expect. . .

Slingerlands, N. Y., has two airports so close the patterns interlap. **Ralph Moser** is a great one for breakfast flights and the like. He and a goodly crew go to **AOPA's** round-ups. **Santo Italiano**, manager of **Normanside**, has a flat rate

for student and private courses and has students, too. It's always nice to know what you're paying for something before you get the bill. . .

* * *

Foliage Trips. The biggest source of revenue for **G. E. Harmon** of the **Silver Ranch Airpark (N. H.)** is passenger hops. Yes, passenger hops, but not the usual one or two buck kind. These extended rides are called "foliage trips" out over the **Monadnock** region of **New Hampshire**. What better way to see the flaming colors of the fall leaves? **Silver Ranch Airpark** is on the **Silver Ranch**, well known for "a horsey vacation" and offers a ranch house, riding horses, cabins and a swimming pool for transient pilots.

The **Massachusetts Aeronautics Commission** has done a wonderful job on the installation of **Municipal Airport** signs. The signs are larger than road signs and not only will you have no trouble in finding the airport, but the fly-boys can easily return to town or the main route by **MAC** signs. Now, fellows, do the same with all **Massachusetts** commercial airports, will you?

Noticed a surprising thing in **Massachusetts** "Tail spinner." **Boston-Bedford Airport** had around 2,000 more landings in August than did **Logan**. With all the experimental flying, **Van Dusen**, **Aeromart** and three active operators, it's not hard to understand. **John Erskine** of **Atlantic Aviation** does his share demonstrating **Bonanzas** . . . his sales and servicing of **Beech's** and all types of radio equipment make you know this flying is here to stay. **W. N. Battilana**, manager of **Aeromart**, a division of **East Coast Aviation Corporation**, says the main revenue in parts and accessories is coming from sales of electrical appliances. They have everything from electric clocks to TV sets.

For a guy doing a good job, it's **Van Epps** two to one! **C. A. Van Epps** is with **Wiggins Airways, Inc.**, at **Barnes Municipal**, **Westfield, Mass.** and is doing the **South Americans** a good turn by supplying them with well-schooled airline pilots. Approximately four years ago, **Van Epps** was asked to take over the instruction of four **Colombian** students. With one of these four as exclusive agent in **Colombia**, **Wiggins Airways** has graduated 80. **Van Epps** has only the highest praise for his students. To date, even with **CAA** giving the exams, the writtens have all been above 80 and all students have been graduated.

PEOPLE IN THE NEWS

Brig. Gen. Thomas B. Wilson, former chairman of the board of Trans World Airlines, has been named consultant to **Jesse Larson**, administrator of the General Services Administration.

William B. Davis has been named deputy director of the Office of Aviation Safety, CAA, filling a post vacant since **Ernest S. Hensley** was made director of the office last year. Davis joined CAA as an aeronautical inspector in 1938.

Gene Kropf, assistant to the dean at Parks College of Aeronautical Technology, St. Louis University, has been chosen by the board of directors of the University Aviation Association for succession to the presidency at UAA's annual business meeting in Miami next July.



Kropf

David L. Behncke has started his 11th term as president of the Air Line Pilots Association. Other officers re-elected at the recent ALPA convention in Chicago are: **Clarence H. Sayen**, executive vice president; **Jerome E. Wood**, first vice president; **F. A. Spencer**, secretary, and **R. G. Strait**, treasurer.

Sydney Nesbitt has resigned as director and president of Atlantic Aviation Corp., Teterboro, N. J. **Watson E. Richards**, executive vice president of Atlantic Aviation, has been appointed general manager of the Teterboro operation.



Island Spirit—This is new Aloha Lounge at Los Angeles International Airport in which United Air Lines serves pre-flight coffee—and, of course, pineapple juice—to Honolulu passengers. Special interior decorating job represents investment of approximately \$6,000.

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WINGS OF YESTERDAY

25 Years Ago

The Postmaster General issued invitations to bid for the operation of two new contract air mail routes—(1) between Chicago, Ill., and St. Paul-Minneapolis, Minn., and (2) between Cheyenne, Wyo., and Pueblo, Colo.

Charles L. Lawrence, president of Wright Aeronautical Corp., was elected president of the Aeronautical Chamber of Commerce for the year 1925-26.

Because of the change in the nature of its business, The Curtiss Exhibition Co. changed its name to Curtiss Flying Service, Inc.

10 Years Ago

(In AMERICAN AVIATION)

National Advisory Committee for Aeronautics announced the selection of Cleveland as the site of an \$8,400,000 aircraft engine laboratory.

Directors of Boston-Maine Airways, Inc., voted to change the name of the company to Northeast Airlines, Inc.

Agreement was reached between the U. S. and Great Britain on the location of sites for naval and air bases in the Bahamas, Jamaica, Antigua, St. Lucia, British Guiana, Bermuda and Newfoundland.

LETTERS

Protests Governmentese

To the Editor:

The October 23 issue of *American Aviation* contained a small symptom of an affliction which I hope sincerely will not develop.

The various pronouncements, proposals, regulations and standards issued by the government are filled with words useable and understandable only to a bureaucrat. Your publications, however, have been written in clear and proper English, and are a welcome relief from the flood of Governmentese.

It was with horror then that I found the following item under Civil Aeronautics Board—Mail Rates.

"We in Alaska Airlines will get \$150,000 back mail pay . . . if CAB show cause proposal is finalized."

I am an instinctive grammarian, having forgotten what little formal rules I once knew, so that when I recovered from the initial shock of revulsion from seeing this "word" in a private publication, I tried to check on its actual existence.

My abridged Webster's does not list the word as such, but apparently sanctions it indirectly in its description of the use of the suffix "ize." My only other reference, H. L. Mencken's "The American Language," in Supplement I provided me with much better support. He quotes an order issued by Maury Maverick to "the tax-eaters under his command."

"Be short and say what you are talking

about. Let's stop pointing up programs, finalizing contracts . . ."

You would perform a great service by finalizing the deletion of this and similar bastard words from your writers' vocabularies.

EDWARD M. ROBERTS,
Flushing, N. Y.

British Jet Transports

To the Editor:

The statement by G. T. Baker in *American Aviation* of October 23 is interesting but to what does he refer when he speaks of his chief pilot having flown "all of England's current crop of jet transports?"

It seems to me that the U. S. manufacturers are afraid of British turboprop airliners invading their domestic market, and they are certain to make a strong bid for a come-back in both fields by about 1954. Naturally, American engine makers are concentrating on the turboprop because it is what their home market can use; because of that concentration they are sure to offer a stop-gap aeroplane, a modified DC-6 with about 400 mph and a good range and economy for external and internal operation. But they will find the mechanical complications tending to drag that economy down. In England we have not the same incentive to give the turboprop a priority over the jet in transport operations, because we have no congested internal airlines, and now rearmament is going to help the development and bug-eradication in British jets, so we have quite a lot of help in our bid to retain leadership in the jet turbine.

(NAME WITHHELD),
England.

(Editor's Note: The year estimated by the writer when U. S. industry will swing over fully to commercial turboprops agrees with Dr. A. Plesman's recent forecast.)

BOOKS

JET PROPULSION—TURBOJETS, by Volney C. Finch, Professor of Mechanical Engineering, Stanford University. Published by the National Press, Millbrae, Calif. 328 pages. \$5.

This volume on jet engines is as well illustrated and presented as the companion book to the one on turboprops by the same author (reviewed *American Aviation*, Nov. 13). The more extensive knowledge and understanding of the turbojet engine is reflected by the longer text and more detailed treatment of the component assemblies than was undertaken in the book on turboprops. Those who want a broad summary of all the main avenues of research on this subject will find it in this book.

Although some of the references in the book go back to the Jumo 004 (near the dawn of gas turbine history), the main conclusions are drawn from an analysis of such modern jets as the General Electric J-47 and the Rolls-Royce Nene. There is much entirely new information in the text but it may take some digging out; it will, for instance, come as news to most people that fused crystalline alumina is now thought to be one of the best materials for ceramic coating of turbine buckets. Few of the illustrations show startlingly new information but some of them contain much that is unpublished, like the thrust of the Ghost jet at 700 mph at sea level which is given as 6,110 lbs.

The book is not free of spelling mistakes and deserves an index about five times as comprehensive as it is, but the volume will be widely recognized as an outstanding attempt to present a factual and accurate record of modern turbine practice and is therefore a welcome book which should fill a valuable need at the present time.

—R. G. W.

En Route

(Continued from Page 54)

ica, those TWA press agents kept me filled up with Coca Cola for days afterwards. I made 'em pay hard for that one.

Well, we finally had to get out of the palace and let the King and Queen do whatever kings and queens do for a living, but on the way we posed for a photo on the grand staircase. And at this point Queen Frederica did one of those things that only a great lady can do. In our group was Ed Slattery, the CAB's director of public information, who walks on crutches and who goes up and down stairs with difficulty. We were all plunging down to mug the camera and the Queen looked up the staircase and couldn't see Slattery. So she walked right up the center of the staircase, causing us all to move to one side or the other, and found Slattery making his way down slowly from the top. She walked down with him step by step and placed him in the very center of the group. In all my life I don't think I have ever seen anything so considerate done with such absolute graciousness. It touched us all. Queen Frederica is one great lady worthy of the title.

TECHNICAL LITERATURE

INSPECTION BULLETIN: Dy Chek Co., 1515 East Broadway, Hawthorne, Calif., is publishing a monthly bulletin on industry applications for the dye penetrant method of inspection. Known as the "Inspection Clinic," the bulletin is available without charge.

FIRE FUNDAMENTALS: Ansul Chemical Co., Marinette, Wis., has available an illustrated four-page booklet on "Fundamentals of Fire Extinguishment" which discusses what fire is, classes of fire and proper methods of extinguishment.

SCAFFOLD FITTINGS: Amidon Sales Company, Box 61, Elyria, Ohio is circulating a six-page illustrated bulletin describing the Amidon three-way fitting, two-way fitting and sleeve used to assemble pipe into fixed or rolling scaffolds of any heights, size and shape.

TAXIWAY LIGHTS: Line Material Co. has published a 16-page illustrated bulletin titled "Medium Intensity Taxiway Marker Light." The useful bulletin shows complete bills of material and schematic wiring diagrams for both series and multiple elevated taxiway marker lighting system circuits as well as useful engineering data on components.

CYANIDING BULLETIN: Surface Combustion Corp., Toledo 1, Ohio, has available bulletin S C-145, "Dry (Gas) Cyaniding in Surface Continuous & Batch Type Furnaces." The four-page illustrated bulletin presents latest developments in equipment and applications in this field. Both liquid quenching and slow cooling and their applications are described.

SURFACE WAVE TRANSMISSION: The Office of Technical Services of the Dept. of Commerce, Washington 25, D. C., has published bulletin PB 100 172 titled "Surface Waves and their Application to Transmission Lines." This 47-page bulletin covers the use of enameled wire in place of coaxial cables or rigid wave guides for the transmission of ultra-high-frequency signals.

AMERICAN AVIATION

IN FLIGHT

A PAGE FOR ALL PILOTS

Globe-Circling Gas Consumption

How much gasoline is required to fly a DC-4 around the world?

Capt. Dick Rossi of The Flying Tiger Line burned up 23,000 gallons flying a group of seamen to Bombay, India, from San Diego and returning with another group to replace them after the men had refused to sail on a British steamer they said was being sent into the Korea war zone. Rossi's 23,200-mile route was San Diego via New York, Gander, Paris, Nicosia, Bahrein, Bombay, Bangkok, Manila, Guam, Wake and Honolulu.

Bombay is only about 200 miles from midway so several hours were gained by following prevailing winds on around the world instead of backtracking. Flight took seven days and seven hours, but 36 hours were lost in flight clearance and custom delays. It can be done in five and a half days without straining, Rossi said.

New ALPA Committees

The Air Line Pilots Association has authorized **David L. Behncke**, ALPA president to appoint two new committees—one on public relations, the other on safety—as part of a program to improve safety in flight.

The new Safety Committee, which will be appointed soon, will be of a permanent character and its duty will be to follow through with CAB and CAA on recommendations which the pilots make from time to time pertaining to safety in air travel. It will also concern itself with airline maintenance standards.

The Public Relations Committee will be organized on a "grass roots" basis and will work through the various ALPA councils with members of Congress who represent council areas in the national legislature. Attempts will be made by the committee to enlist the support of all ALPA members behind the association's legislative program by working with their respective members in Congress.

Flight Crew Gets AA Award

American Airlines' highest honor, the Distinguished Service Award, has been made to **Captain Bob Baker** and his crew. This was the AA crew which piloted a badly damaged Douglas DC-6 to a safe landing after number 3 engine threw a propeller blade, tore out the engine and ripped a sizable hole in the top of the cabin. Baker is cited "For piloting skill in safely landing his plane after sustaining major structural damage."

First officer on the flight was **Robert Reinicke**, flight engineer **D. J. Niemiec** and stewardesses **Joan Robinson** and **Margie Peterson**. All four were cited for "superior performance of duties in the face of an emergency in flight."

Miami's Air Show

"Civil Air Power" will be the theme of the Miami Air Show, January 6-7. **Jess Bristow**, president of the Florida Air Pilot's Association notes that the objective will be to "demonstrate the utility of non-airline civil aviation including agricultural, industrial, executive and personal flying." The objective is a worthwhile one and one which should attract private pilots from near and far for the show which supplants the Miami All-American Air Maneuvers.

As many as 300 private pilots are expected to take part in the Miami-Havana Air Cruise starting January 8.



New Ticket—One of the new airmen certificates is shown here alongside the regular, oversized document currently in use. **John E. Sommers**, CAA representative on the Air Navigation and Development Board, received one of the first pocket-sized airmen certificates in exchange for his old one. He holds certificate number 59. **Clair Callaghan**, CAA aircraft accident analyst and former WASP pilot, compares the new ticket with her own certificate: Number 67,447.

Other features of interest will include a series of stock plane races, sponsored by The Florida Aviation Corp., open to sportsmen pilots and a promise by **Rodney Joceyln** to be on hand to defend his national aerobatics championship.

The schedule reads like this: Miami Aviation Week, Jan. 2-7; Annual Miami Air Show, Jan. 6-7; 8th Annual Miami-Havana Air Cruise, Jan. 8-10.

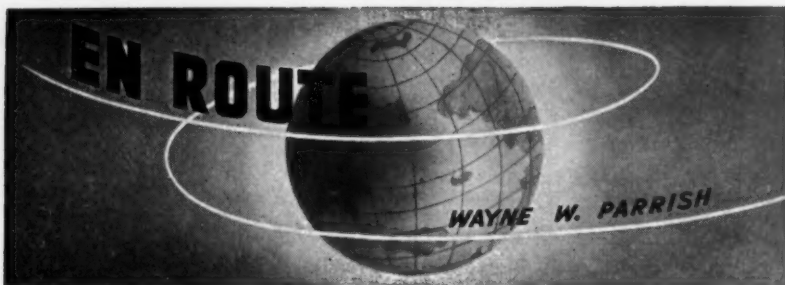
Flight Surgeon Defined

At one time we used to flip through the pages of *The Journal of Aviation Medicine*, official organ of the Aero Medical Association, out of sheer duty. Gradually the duty became a pleasure and today we look forward to new issues. With broad new fields of knowledge opening up, including flight at new altitudes and speeds and all the related problems, the *Journal* strikes a happy balance in presenting readable technical articles on aviation medicine.

On the whole the *Journal* is not a humorous diet. Yet we did get a smile out of one item in the October issue. In his otherwise serious report on "Naval Aviation Medicine," Rear Admiral B. Broesbeck, Jr. (MC) USN, quotes the following definition of a flight surgeon:

"This doctor is a supermedico, he is a keen diagnostician and can spot athlete's foot at twelve paces and a goldbrick at six, can sop up bourbon like a prewar sponge, dance like Fred Astaire, lose \$300 playing poker or delve into a pilot's subconscious—all with equal dexterity and equanimity."

—W.D.P.



Corn to Kings. Man and beast, I'm really getting up in the world. So far this year I've hob-nobbed with the **Perons** of Argentina, the **Pope** in the Vatican, the **President of Portugal**, and **Franco** of Spain. But all that was minor league. Now I've finally made the grade with royalty.

Meeting the **King and Queen of Greece** lifted your rambunctious corn-country globe-hopping correspondent onto a new high level. I'm moving in the right circles at last. I expect to be treated with proper respect in the future. Yep, I'm the guy who used to draw up on his bicycle on North Main Street to wait for a long Wabash freight train to lumber through town so I could get on with delivering my papers. That was back in Illinois. But now, you peasants, I'm entertained in royal palaces. And don't think that's easy these days. It isn't every palace that has real royalty living in it, times being what they are.

♦ ♦ ♦

How Come, Senator? Of course there were about 50 other folks along while I was being entertained by Their Majesties, but I let 'em come along. Seems like they were on some sort of TWA press flight. I'm generous about letting others share the lime-light. Nothing to lose by letting **Ralph Damon** get in the act. But just look at the photo on this page and you'll see how I rate. Damon is 'way off to one side. But look at me, smug, cocky, self-satisfied at having nudged my way into position, standing just behind and between **King Paul** and **Senator Ed Johnson** of Colorado. By the way, Senator, how did you ever manage to get in front of me, anyway?

So you peasants want to know more, eh? Okey, I gotta coupla minutes during lunch hour to letcha in on making the big time. It ain't everybody I'd tip off, but I want to keep the common touch. I ain't ever goin' to get so big I can't remember pitching alfalfa, driving an old Model T half-ton Ford truck and gettin' down on my knees and scrubbing the kitchen floor at home on Saturdays. Royalty won't turn my head that much, not over 180 degrees, anyway. But the Good Lord must have intended me for a life of luxury and moving around with big shots because I find it so easy to adjust myself. You peasants wouldn't understand, you low-life scum. Get out of our way. The Queen and I want to talk privately.

♦ ♦ ♦

Ride, Don't Walk. Well, this gang of ill-bred newspapermen and unlettered TWA press agents who somehow

chiseled their way into my visit with the King and Queen, were taken in limousines from the King George Hotel in Athens to the palace a few blocks away. Couldn't walk, of course; it just isn't right to walk to a palace. Gotta go in style.

We were escorted up an impressive marble staircase to a series of tastefully but not elaborately decorated parlors. Incense pervaded the air. And before we knew it, we were going in single-file to be greeted individually by **King Paul** and **Queen Frederica**. And who do you suppose was introducing us to them? None other than **Gordon Gilmore**, TWA's public relations director. This was a let-down, but the King had telephoned me earlier for a clerk of some kind who knew all the names and I had told him I knew of a bird who could handle it. I had to buy Gordon a clean shirt and tip him off how to act and if ever you need a first class palace courtier let me know, I have just the guy.

♦ ♦ ♦

Chocolate Sundae. As I shook hands with the King and Queen they gave me a sly wink to let me know that I was the honored guest but they just had to let this TWA press crowd

in, too, and hoped I wouldn't mind. We're sly ones, Their Majesties and I.

After the introductions, cocktails and sandwiches and cakes were served and we stood around talking for an hour. I asked the King how many hours he had accumulated as a pilot and he said about 200 but of course he has only flown as a passenger since the war.

Then I joined in the group talking with **Queen Frederica**, who is a charming, lovely, gracious and smart woman. She was saying that she has never been to the U. S. but wants to come soon and wants most of all to go to a typical American drug store and have a chocolate sundae. So TWA's publicity man in Washington, **Tom Bell**, whose benign appearance covers up an alertness not to be discounted or under-estimated under such circumstances, told the Queen he would take her to a People's drug store in Washington as soon as she hit the place. I was aghast when she accepted but I hadn't had a chance to warn her privately about this guy Bell. I know a much better drug store, anyway, and she can come and look at my television set anytime. I'm just downright hospitable at times.

♦ ♦ ♦

A Real Queen. I had to crack Bell's shins in order to get into the act myself and I asked the Queen whether she likes to fly. She answered with a resounding "No," which just about put a sudden crushing end to our tete-a-tete but she went on to say that she had flown seven round trips between Athens and South Africa during the war and didn't enjoy them. No wonder, the equipment was pretty bad for long hauls like that in those days. So I piped up cheerfully, "Oh, but it's very smooth and comfortable flying on TWA." Well, friends, after that plug for TWA with my friend Queen Frederica

(Continued on Page 52)



TWA PRESS FLIGHT GROUP at royal palace in Athens. Front row, right to left: Senator Ed Johnson of Colorado, the King and Queen, Mrs. Peurifoy and the American Ambassador. WWP is just behind the Senator and King Paul. Ed Slattery, director of public information of CAB is in center just to left of the Queen. Ralph Damon, TWA president, is second from left in fourth row. The other people just wandered in and are supposed to be prominent newspaper writers and editors and TWA public relations people.

(Continued from opposite page 3)

New Tooling Method: A new method of tooling up for production of large equipment units has been developed by Republic Aviation Corp. under government contract, and will be made available to other manufacturers. System employs an optical basis instead of a physical surface for controlling dimensions in production fixtures, and is expected to allow reductions in tooling costs up to 30%.

Metals Report: A 162-page preliminary report of a \$100,000 research program on handling the super-hard metals used in jet aircraft has been completed by Air Force's Air Materiel Command, and copies are available to companies concerned.

More Silencers: Three additional Maxim silencers are being installed by Lockheed Aircraft Corp. at its Van Nuys, Calif., test base, as a result of success of an experimental silencer model in cutting down jet engine and afterburner noise during run-ups. Maxim silencers use water to lower energy in the 3,500-degree blasts from jet engine tailpipes.



MILITARY

Korean Conclusions: Maj. Gen. L. S. Kuter, commander of Military Air Transport Service, has listed five conclusions reached after reviewing MATS' service in Korean airlift: (1) air transport can supply ground forces in the field and eliminate long periods of waiting for supplies, even in face of enemy opposition, if supplies are vital to success of a ground operation; (2) MATS must retain flexibility which will permit it to concentrate resources to meet a local crisis without disrupting operations in other parts of the world; (3) air evacuation of wounded is sound, economical, efficient and effective; (4) there is need for further development of a mobile "packaged" communications center which can be flown where needed on short notice, and such development is underway; (5) need has again been demonstrated for a cargo plane with such economy operation that large numbers can be continuously in commercial service.

Greenville Rehabilitation: Air Force decided to contract with a civil organization to rehabilitate Greenville Air Force Base, Miss., which is to be a civilian-operated USAF basic flight training school. AF had previously stated that it would rehabilitate the base itself. The 387-building World War II air base has been inactive since August, 1946. Interested contractors should contact Procurement Services Division, Headquarters, Air Training Command, Scott AFB, Ill., for bid forms. Bid specifications for flight training at Greenville have already been issued, with Dec. 4 deadline for submission.

ADC Moves: Air Force Air Defense Command will move early next year from Mitchel AFB, L. I., N. Y., to headquarters at Ent AFB, Colorado Springs, Colo. ADC was recently elevated to major command level.

AMC Contracts: Air Force's Air Materiel Command has awarded the following contracts in excess of \$100,000: Biederman Motors Corp., Cincinnati, O., \$582,785, engine assembly; Chris J. Van Eyk d/b/a Seaboard Electric Co., New York, \$213,409, flashers; Denison Engineering Co., Columbus, O., \$126,400, stand assemblies; McColpin-Christie Corp. Ltd., Los Angeles, Calif., \$103,300, portable rectifiers.



AIRLINES

10-Months' Traffic: The 16 domestic trunk airlines flew almost as many revenue passenger-miles in

first 10 months of 1950 as in the entire year 1949, according to Air Transport Association compilation. The lines flew 6,563,846,000 passenger-miles (charter traffic excluded) in first 10 months against 6,582,294,000 in 12 months last year, and 5,611,250,000 in first 10 months of 1949. Estimates for November and December indicate a 1950 total of 7,754,107,000, or 18% over 1949.

KLM Orders Planes: KLM Royal Dutch Airlines has placed new orders for nine L-1049 Constellations and seven Douglas DC-6B's (see story on page 1 of News Section). The Constellations will be powered by Wright Turbo-Cyclone C-18DA-1 compound engines of 3,250 hp. each, and will be the first commercial planes equipped with such engines. Planes will be 66-passenger versions, grossing about 130,000 lbs. and cruising at 324 mph. at 30,000 ft. Delivery will be in late 1952. DC-6B's will be powered by Pratt & Whitney R-2800 CB-17 of 2,500 hp. permitting 106,000-lb. gross and 325 mph. cruising speed at 25,000 ft.

New Military Agreement: Domestic airlines and military agencies have signed new agreement covering 10% fare discount on official military travel. Agreement is effective from Dec. 1, 1950, to June 30, 1951. New regulations are expected to be issued by Defense Dept. to transportation officers in the field which will result in airlines being placed on much more equitable basis with railroads as regards this travel. Although rail is preferential in the rail, air and bus agreements, the new regulations will state that airlines will be used when they provide more satisfactory service than other modes of travel, and price is not the determining factor.

202's Return: Northwest Airlines last week started returning its Martin 202's to service after a special inspection. Croil Hunter, NWA president, said inspection "has clearly shown that there are no structural deficiencies" in the plane.

1951 Summer Fares: National Airlines proposes 1951 summer excursion round-trip fares from northeast to Florida at 133% of normal one-way tariff, and will ask CAB approval shortly although fares will not be effective until May 15. New York-Miami round-trip would be \$99.90. Last year CAB clamped down on NAL's low-fare excursion proposal. After a CAB investigation, the 1950 program was operated only for a brief midsummer period at fares 150% of one-way.

People: Charles L. Hood, who has been National Airlines' district sales manager in New York, has been recalled to Miami as assistant to Walter Sternberg, vice president-sales. Parke Wright, Washington district sales manager, moves into Hood's former post . . . Jack R. J. Davis, who has been assistant to TWA's vice president-regulatory proceedings, has been appointed supervisor of route development for Mid-Continent Airlines . . .



CIVIL AERONAUTICS BOARD

Cuba-Florida Decision: In the Cuba-Florida Air Carrier Permit Case, CAB last week: (1) authorized Servicios Aereos to carry mail and property between Havana and St. Petersburg, Fla., for three years, (2) extended effectiveness of Havana-Key West permit of Aerovias "Q" to Feb. 10, 1955, and gave the line three-year permit to fly Havana-Tampa; (3) extended to Apr. 4, 1954 the Havana-Miami foreign air carrier permit of Compania Cubana de Aviacion; (4) reopened the case to permit Expreso Aereo Inter-Americano to introduce further evidence bearing on its fitness, willingness and ability to operate a Havana-Miami route, and to permit Servicios Aereos to introduce similar evidence on proposal to fly passengers Havana-St. Petersburg.

Actions

Chicago and Southern Air Lines' certificate for Route 8 amended to eliminate Bloomington, Ill., as intermediate point between Chicago and St. Louis, effective Jan. 16, 1951. Ozark Airlines was previously authorized to serve Bloomington on its local service Route 107. Last year CAB dropped Springfield and Peoria, Ill., from C&S, but deferred action on company's request to eliminate Bloomington for simultaneous consideration with Parks investigation case. It was not included in that decision, however, and C&S renewed request last month.

City of Lumberton, N. C., turned down by CAB on its application for air service. City had asked service by Eastern and Piedmont but CAB said neither carrier could furnish service without substantial annual losses in revenue.

Applications

American Airlines and TWA asked one-year extension of transcontinental coach tariffs, and Western Air Lines and United Air Lines asked similar extension of Los Angeles-San Francisco coach fares, slated to expire Dec. 31. Indications were that CAB would approve tariffs only through Mar. 31, 1951, to permit simultaneous consideration in the future of all coach tariffs. CAB up to now has been handling New York-Los Angeles and Los Angeles-San Francisco separately from other coach tariffs because of different expiration dates.

Central Airlines has applied for new route segment between Wichita, Kans., and Lincoln, Neb., via Junction City, Fort Riley, Manhattan, and Topeka, Kans., and Falls City, Neb. At the same time, a Wichita-Omaha route request was withdrawn.

Mid-West Airlines filed application for extension of Route 90 from Sioux City to Chicago and for additional route segment between Rochester, Minn., and Moline, Ill. Company asked consolidation of application with pending North Central route investigation case in which Mid-Continent Airlines faces possible transfer to a local service airline of routes awarded it in Parks investigation case decision. Mid-West's Sioux City-Chicago proposal generally parallels one MCA feeder segment with intermediate stops at Ft. Dodge, Mason City, Waterloo, Dubuque, Freeport, Rockford and Elgin. Rochester-Moline proposal anticipates intermediate service to Clinton and Dubuque.

CIVIL AVIATION

Instructor Proposal: Civil Aeronautics Board is proposing revision of Civil Air Regulation Part 51 so that ground school instructors will no longer be required to possess a CAA ground instructor certificate. Interested persons can submit views to CAB Bureau of Safety Regulation, Washington, D. C., until Jan. 2, 1951. CAB officials explain that provision for certifying instructors was adopted when qualified instructors were few and it was considered necessary in interests of safety. Now, however, many war-trained instructors are available, and in addition many states require them to obtain state teacher certificates. In line with CAB's policy of placing responsibility on individual operators to maintain competence and safety standards, responsibility for obtaining competent staffs would be placed on the schools.

FINANCIAL

Manufacturing

Bell Aircraft Corp. reported \$786,219 profit, or \$1.80 per share, on \$18,778,223 sales for nine months ended Sept. 30, against \$49,045 profit on \$8,184,158 sales in same 1949 period. Report includes operations of Bell Aircraft Supply Corp., and W. J. Schoenberger Co., subsidiaries.

Pacific Airmotive Corp. reported October sales of \$1,838,721, an all-time high, up 65% over September and comparing with \$624,073 in October, 1949. Sales for 11-month period ended September, 1950, totaled \$10,559,574.

Rohr Aircraft Corp.'s first public financing is offering of 238,000 shares at \$11.50 per share by banking group headed by First Boston Corp. and Lester & Co. Of the offering, 100,000 shares represent additional stock being issued by Rohr, while remainder are being sold for accounts of several stockholders. Proceeds from sale of the 100,000 shares will be added to company's general funds as reimbursement for prior redemption of its outstanding 5% cumulative preferred stock and to finance payment of all outstanding 5% mortgage notes. Following the financing, Rohr's capitalization will consist entirely of 600,000 common shares.

Airlines

Braniff Airways' net profit after taxes for first nine months of 1950 was \$768,952, against \$215,887 profit in same 1949 period. Total revenues this year were \$15,427,092 against \$13,695,824 last year, while expenses were \$14,280,640 against \$13,378,537.

Chicago and Southern Air Lines reported net income of \$650,818 for the first 10 months of 1950, compared with \$598,161 net in same 1949 period.

The Flying Tiger Line's third quarter net profit after taxes was \$590,158 on operating revenues of \$3,496,780 and operating expenses of \$2,601,566. Improved earnings resulted from almost 100% increase in company's common carriage air freight business and substantial increases in foreign contract business and customer service maintenance volume, a report to stockholders said.

Dividends

Chicago and Southern Air Lines declared 30c dividend payable Dec. 15 to stockholders of record Dec. 1.

Eastern Air Lines declared dividend of 25c per common share, payable Dec. 18 to stockholders of record Dec. 1. Two dividends in like amount are to be paid next year, resuming annual 50c per share payment that was interrupted in 1947.

LABOR

Martin Increase: Wage increase that will add \$3,000,000 to the payroll in the next year has been granted to its employees by The Glenn L. Martin Co. Hourly employees will be raised 9c to 13c an hour, with salaried workers receiving increases averaging 6%. In addition, 14 classifications of factory work have been up-graded one labor grade, giving them a higher immediate boost. Also installed is a new pension plan providing for increased retirement benefits to a maximum of \$112.50 a month including Social Security.

IN GENERAL

Petroleum Agreement: National Production Authority and Petroleum Administration for Defense have reached agreement covering allocations and priority powers over petroleum, oil and related industries. NPA will decide how much material, such as steel and aluminum, shall be allocated to petroleum, oil and related industries, and PAD will divide the materials among producers. Industries which produce primarily for oil industry, such as makers of derricks, rigs, pumping units and tetraethyl lead, can be brought under PAD; certain products of petroleum and gas origin may be distributed by NPA instead of PAD to conform with normal trade practices.

Brewer Award: National Aeronautic Association has named Lt. John H. Burton, USN, to receive the 1950 Frank G. Brewer Award in recognition of "inspiring and effective leadership in planning and carrying out the 1950 air youth education and model airplane programs of the United States Navy." Presentation will be made Dec. 16 at annual Wright dinner in Washington.



Allison "501" Turbo-Prop engines fit in nacelles of present commercial transports.

A new kind of Air Travel is in the making

**New Navy engine—
soon to undergo first tests
in civilian transport—promises
smoother, faster, quieter,
more pleasant air travel**

WITHIN a short time the first American commercial airliner powered by turbine engines will be delivered to the Allison Division of General Motors.

The power plants in this Convair are the new Allison Model "501" Turbo-Props—commercial version of the Navy T38 engine. They are geared to new-type propellers especially designed and built for high-engine-power characteristics by the Aeroproducts Division of General Motors.

The "501" is lighter, smaller, smoother and quieter than any other propeller-type engine of equal horsepower. It develops 2,750 horsepower and weighs only 1,250 pounds!

As soon as this experimental Turbo-

Prop transport is received, General Motors-Allison engineers will start putting it through a comprehensive series of flight tests.

In cooperation with the airlines it will be flown under all types of operating conditions—in all kinds of weather. It will be given the works, checked and rechecked many times over, until all its performance characteristics are definitely evaluated.

Such an all-out test program may take a year or more. But it will be well worth it, in view of the fact that present military experience indicates that Turbo-Prop power should bring the following benefits to commercial aviation:

Smoother, quieter operation—for more comfortable travel; also lower maintenance and overhaul costs.

Ability to use low-cost, low-octane fuels, without increased consumption.

Faster speed — up to maximum limit permitted by airframe design.

Very low engine weight—less than half—increasing range or pay load.

Much improved take-off and climb—permitting use of shorter runways, with greater safety and better schedules.

Usable in present aircraft—no costly modifications in changing over to turbine power.

When General Motors is satisfied with its tests of these engines and they are approved for commercial use by the C.A.A., it will be possible to convert present airliners to smoother turbine power without further delay—giving America very high-speed, low-cost, regular airline service.

The development of the Allison Turbo-Prop engine, America's first axial flow propeller-type turbine engine, together with Aeroproducts Propellers, is another example of General Motors progress—and who serves progress, serves the nation.

*Your key to
Better Power*



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"MORE AND BETTER THINGS FOR MORE PEOPLE"

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SOUTHERN AIRWAYS Commutation Service links 30 cities in the Southeast with sleek, Texaco-lubricated DC-3's. Under this system, passengers can spend a business day in any city on Southern's system and return by plane to the point of departure at the end of the day.



SOUTHERN AIRWAYS OFFERS COMMUTING SERVICE

Texaco helps assure dependable, economical operation

Southern Airways has already logged more than 61½ million passenger miles in the operation of the only local air service in the Southeast. Maintenance of dependable schedules is of prime importance, so dependable engine operation is a "must." That is why Southern lubricates its DC-3's with *Texaco Aircraft Engine Oil* exclusively.

In this choice, Southern Airways is in the good company of leading airlines everywhere. In fact—

More revenue airline miles in the U. S. are flown with Texaco Aircraft Engine Oil than with any other brand.

Texaco Aviation Products and Lubrication Engineering Service are famous for producing high efficiency and reducing costs. Let a Texaco Aviation Representative help you gain these benefits for your operation. Just call the nearest of the more than 2,000 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, *Aviation Division*, 135 East 42nd Street, New York 17, N. Y.



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FOR THE AVIATION INDUSTRY

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